MEDICAL SOCIETY OF THE STATE OF NEW-YORK

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# TRANSACTIONS

OF THE

# MEDICAL SOCIETY

OF THE

# STATE OF NEW YORK

FOR THE YEAR 1902

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# MEDICAL SOCIETY OF THE STATE OF NEW YORK

## Organization

By an act of the Legislature passed in 1806 the Medical Society of the State of New York is organized as follows:

The Society is composed of Delegates and permanent and honorary members.

Delegates are sent by county medical societies, certain medical colleges, incorporated voluntary medical societies, and by the New York Academy of Medicine. Each county medical society is entitled to five delegates for each Assembly district in said county; incorporated medical colleges and voluntary medical societies, which are admitted to representation under provisions in the by-laws, to one delegate each; and the New York Academy of Medicine to five delegates. A delegate must be a member of a county medical society. County medical societies are by the by-laws required to pay to the Treasurer for the use of the Society five dollars annually for each Assembly district in the county, and other organizations the same for each delegate they are entitled to send; no delegate is permitted to register at the Annual Meeting until the dues of the organization he represents have been paid. Delegates are elected for a term of three years.

Permanent Members are elected at the Annual Meeting of the Society. Eligibility is secured by service as a delegate for three years and attendance and registry as such at not less than two meetings; membership in a county medical society is also a requisite. Permanent members pay an initiation fee of five dollars and annual dues of the same amount.

The Society may elect eminent physicians of other states or countries to *Honorary Membership*, who have been nominated at a previous meeting; not to exceed two in number in any year. Physicians present at any meeting who are members of county medical societies can be made *Members by Invitation* for the meeting. These have all the privileges of the meeting except the right to vote or hold office.

Eight Districts, following the lines of the Judicial Districts, into which the State is divided, may each by the members present from it at an Annual Meeting elect a member of the Committee of Nomination. They are as follows:

*First District*—New York County.

*Second District*—Kings, Queens, Suffolk, Richmond, Westchester, Rockland, Putnam, Orange, Dutchess Counties.

*Third District*—Albany, Rensselaer, Schoharie, Greene, Columbia, Ulster, Sullivan Counties.

*Fourth District*—St. Lawrence, Franklin, Clinton, Essex, Hamilton, Fulton, Montgomery, Schenectady, Saratoga, Warren, Washington Counties.

*Fifth District*—Onondaga, Oneida, Herkimer, Oswego, Lewis, Jefferson Counties.

*Sixth District*—Otsego, Delaware, Madison, Chenango, Cortland, Tompkins, Schuyler, Chemung, Tioga, Broome Counties.

*Seventh District*—Monroe, Wayne, Cayuga, Seneca, Yates, Ontario, Livingston, Steuben Counties.

*Eighth District*—Erie, Niagara, Orleans, Genesee, Wyoming, Allegany, Cattaraugus, Chautauqua Counties.

The Annual Meetings of the Society are held in the city of Albany, on the last Tuesday in January, and other meetings at such time and place as may be determined at any legal meeting. Fifteen members constitute a quorum for the transaction of business.

# OFFICERS AND COMMITTEES

Elected January 30, 1902.

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PRESIDENT,

HENRY REED HOPKINS, Buffalo.

VICE-PRESIDENT,

WILLIAM A. MOORE, Binghamton

SECRETARY,

FREDERIC C. CURTIS, Albany.

TREASURER,

O. D. BALL, Albany.

COMMITTEE OF ARRANGEMENTS,

HERMAN BENDELL, Albany. WILLIAM J. NELLIS, Albany.
REYNOLD W. WILCOX, New York. HOWARD VAN RENSSELAER, Albany.
FRANCIS E. FRONCZAK, Buffalo.

COMMITTEE ON BY-LAWS,

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F. C. CURTIS, Albany.

COMMITTEE ON HYGIENE,

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GEORGE B. FOWLER, New York J. M. VAN COTT, Brooklyn.
M. A. VEEDER, Lyons. J. H. PRYOR, Buffalo.
D. V. STILL, Johnstown.

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SMITH BAKER, Utica.

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F. C. CURTIS, Albany. DANIEL LEWIS, New York.
WILLIAM C. KRAUSS, Buffalo. O. D. BALL, Albany.

# Minutes of the Proceedings

of the

# Medical Society of the State of New York

## at its Ninety-Sixth Annual Session

held at

Albany, January 28, 29 and 30, 1902

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### First Day.—*Morning Session*

The President, Dr. Henry L. Elsner, of Syracuse, called the meeting to order on January 28, 1902, at 10 A. M., in the Common Council chamber of the City Hall, Albany, and the exercises were opened with prayer by the Rev. William Prall, D. D., of Albany.

The President then delivered his

### Inaugural Address

Gentlemen: The material assistance, support and encouragement, received from the loyal members and delegates of the Medical Society of the State of New York, have lightened the cares of your presiding officer during the past year. Work, which seemed monumental at the beginning of the year, has been accomplished, and it is with great satisfaction that I report to you on this occasion the condition of the Society over which I have the great honor to preside, as promising and healthy, with every prospect for the future in keeping with the achievements of the past.

1. Semi-Annual Meeting. Shortly after my election, preparation was commenced for the semi-annual meeting which was held in New York City on the 16th and 17th of October of last year. In connection with the Committee of Arrangements, I found it necessary to relegate to an Auxiliary Committee, composed of Drs. Phelps, Jacobi, Roosa, Fisher and Van Fleet, many of the details which needed attention in order to make the meeting successful. By concerted action of these gentlemen, the Business Committee, and your presiding officer, the meeting proved successful beyond all expectation. The program was rich in contributions to scientific medicine, while the social features of the meeting were sufficiently manifest to demonstrate the kindly feeling existing within the profession. The

reception given our Society by the Medical Society of the County of New York was a brilliant affair, and was a fitting ending of two days of faithful work.

I wish at this time to express to the Auxiliary Committee, to my Business Committee, and to the Committee of Arrangements, my appreciation of their earnest and successful efforts. To the Medical Society of the County of New York we are indebted for the cordial reception and their many attentions. I would suggest that the Society at this meeting extend a vote of thanks to the Medical Society of the County of New York. The scientific papers with their discussion were of such high order that it would prove a great loss to us if they failed to be published. I would suggest that this Society by vote request the Secretary to gather the necessary manuscript, and that he be directed and empowered to publish these papers; that he enter into contract with the publisher of the Transactions of this the Annual Meeting, with that end in view. Matters of detail in connection with this scheme should be left to the judgment of the Secretary and Publishing Committee.

2. Future Semi-Annual Meetings. The success of this first semi-annual meeting warrants me in suggesting that a semi-annual meeting, devoted to Scientific Medicine only, be held in the City of New York in 1903, and that the question of holding a second meeting during this year in some city of the State other than New York or Albany (preferably Buffalo), be referred to the in-coming President and the *comitia minora*, which as you know includes the chairmen of the Standing Committees. Such committee will be able to pass upon the advisability of holding a second scientific meeting this year after a thorough consideration of existing conditions. There is certainly sufficient material available to make two meetings yearly profitable and inviting, and one of our leading medical journals suggested that the Medical Society of the State of New York could easily secure enough contributions for quarterly meetings.

3. Medical Legislation. The Committee on Legislation has been alert and has been forced to battle against more pernicious activity than ever before. Never, during any session of the Legislature, were so many bills introduced with the object of lowering the standard which has been elevated, as the result of the continued and persistent efforts of the profession as represented by this Society. It is surprising to find that all of these malevolent schemes have some advocates in the Legislature against whom the profession, through its Legislative Committee, must band itself. It is depressing, and at times discouraging, to note the persistent apathy of a large and influential party in the profession in matters of legislation which affects the interests of all. The report of the committee will convince the profession of the necessity of eternal vigilance against an element ready to weaken us in our efforts to protect the profession and the public.

A case of great importance to the profession of this State was recently tried and decided in the Court of Special Sessions of the first division of the City of New York, known as the "The People of the State of New York (upon complaint of the Medical Society of the County of New York), against Louis L. Marvin, defendant, for practicing medicine without registration." It was shown that the defendant in this case gave no

drugs, nor did he use the title of Doctor. He professed to cure; applied "magnetism" and made a diagnosis, charging money therefore. In finding him guilty, the court refused to make the giving of drugs and medicine an essential element in the crime of practicing medicine without registration, and in passing sentence inflicted a fine of $250, and in default of payment, ninety days in the city prison. Judge Hinsdale remarked, "You belong to a class of men who infest this city and by false pretences get a pretty good living out of the poor and credulous people. It is the duty of this court to arrest their career when opportunity offers." This decision has not been reversed and opens the way for the various County Societies of the State to enforce more vigorously than ever before the present Medical Practice Act, without waiting for further legislation.

The so-called Osteopath Bill, now before the Legislature, legalizing a fad which has neither reason for existence nor scientific foundation, deserves the condemnation of the profession and the public. The Legislative Committee will strenuously oppose its passage.

I do not consider it expedient to recommend at this time further action looking to the Legislature for the enactment of a bill defining the practice of medicine in this State. Our recent experience convinces me that we must be content at present with existing laws, which in reality have purged the profession of many noxious elements. Possibly St. Clair McKelway expresses the public sentiment when he says, "For my own part I want to be cured or killed *secundum artem*, but I deny the right of any Legislature to tell me who are *secundum artem*."

4. Suppression of Quackery. A communication addressed to this Society by the Secretary of the Medical Association of the Greater City of New York gives the report of a Committee on Suppression of Quackery. This committee seeks to punish by law regularly graduated physicians who depart from the regular and honorable practice of their profession. I quote from this report, "It is a lamentable fact that the most difficult cases to prosecute are those wherein a lawful practitioner abandons the teachings of his Alma Mater and becomes a recreant and renegade, not for the purpose of establishing a new and better system of treatment, but under the guise of such seeks only personal enrichment." I fully agree that such deflections from the ranks of the profession are unfortunate, but I am thoroughly convinced that no law placed on the statute books can prevent dishonorable or unprofessional action of individual members of the profession. There will always be moral perverts; there will always be those to whom professional probity continues to mean nothing, whose acts are beyond legal control. Our only redress remains the disciplining of the guilty by the County Societies after trial and final expulsion from our ranks. However, I shall ask the Secretary to read the communication to you during the business session, when you will give this question the consideration it deserves.

5. State Board of Medical Examiners and Consideration of Separate Examinations in Internal Medicine. Many who are interested in teaching medicine have for a long time been dissatisfied with the failure of the State Board of Medical Examiners to provide a separate examination in internal medicine. Examinations as now grouped make it possible for the

candidate to graduate without giving proof of a knowledge of the natural history of disease. I would recommend that this matter be referred to the members of the State Board of Medical Examiners representing the Medical Society of the State of New York for consideration and action. You will hear from another source the report of the State Board of Medical Examiners. This is encouraging and deserves thorough consideration.

As a result of the advanced stand taken by our Society, the laws governing the practice of medicine in this State stand as a model for all other States. No greater compliment could have been paid us than that which was included in the eloquent address of Dr. Reed, President of the American Medical Association, when he said, "The laws of the different States are of varying efficiency, the one procured by the Medical Society of the State of New York at the price of yet-maintained excommunication from this body, standing to-day as the model of excellence for the entire country." It is our duty to cautiously guard against the designing, who are year after year exerting themselves to weaken this system by legislative action.

6. State Hospital for Tuberculous Sick. After many months of unfortunate disagreement, the Commissioners appointed by the State to select a site and build a hospital for the tuberculous sick have, with the assistance of a Special Commission headed by the Governor of this State, finally selected Raybrook as the best location for such an institution. This decision meets with the approval of the profession generally so far as I have been able to learn.

This is a large and important undertaking. It means much to the profession and to the State. The Governor in his recent message accentuates the fact that the project is deserving of thorough consideration and study, and wisely suggests that the maintenance of the sick be chargeable to the respective counties from which the patients are sent. The material benefits to the State and municipalities resulting from the treatment of individuals in this institution, if properly constructed and managed, will soon convince the public that the expense was justified and that a liberal policy on the part of the State will ultimately succeed in saving many lives which under the present system are lost and finally become city or county charges during many months before death. This Society will continue to take an active interest in the treatment by the State of these unfortunates and will at the proper time offer assistance to the authorities which shall have for its object the selection of such cases as are best suited for sanitorium and climatic treatment.

7. Tuberculosis Congress. Both the medical and lay world have been much agitated by the utterances of Koch at the Tuberculosis Congress held in London during the past summer. Sanitarians all over the world have continued to recommend to the public the rigid use of the same methods against pollution of milk which were in existence before the reading of Koch's paper. To the scientific world the conclusions of Koch were not a complete surprise, for in this country bacteriologists of note had aroused a suspicion in our minds that perlsucht or bovine tuberculosis, and human tuberculosis, were not identical. It has been wisely assumed, however,

that milk contaminated with tubercle-bacilli, particularly milk coming from cows with diseased udders, was injurious, and it is still believed by the majority of the profession that some forms of tuberculosis, particularly those having their origin in the intestinal tract, and in the peritoneum, have been provoked by the drinking of tuberculous milk. The weight of medical authority still favors the conclusion that bovine tuberculosis may be communicated from animals to man with fatal results. Certain it is that at this time we have no right to become lax in our methods of milk inspection, and until this question is still further investigated, the public must be safe-guarded by methods which are now universally used all over the civilized world.

If the conclusions which Koch reached, and which he presented in his memorable paper, had been brought to the notice of the medical and lay world by a less brilliant light, they would have received little attention. Coming from Koch, however, they must stimulate the scientific world to renewed experiment and bacteriologic research, that this subject may be finally and fully decided. The tuberculin test remains as before, a positive means of recognizing bovine tuberculosis, and we must insist upon its use. I would suggest that the Society express itself by resolution in favor of continuing the present rigid methods of milk inspection and in favor of systematic investigation and renewed experimentation in order that this all-important subject may be thoroughly studied. I would also suggest that this Society commend the thorough work accomplished by the Commission of the Medical Society of the County of New York appointed for the purpose of improving its milk supply, and that we suggest the appointment of similar Commissions in the other counties of the State for the further protection of the public against contaminated and unwholesome milk.

8. Recognition of the New York Pathological Institute. It is a source of congratulation that the New York Pathological Institute, organized a number of years ago, and for a time discontinued, has been reorganized with every promise of great usefulness. The newly-chosen director, Dr. Myer, comes to us with a reputation established by original research in the field to which he dedicated his activities. With the large material at his command in the various State hospitals and with the assistance and encouragement which he is to receive from the well-selected Advisory Board, representing the various asylums and most of the medical colleges of the State, much telling original work will be completed. No college west of Albany is represented in the Advisory Board; there is, so far as I know, no good reason why the Buffalo and Syracuse Medical Colleges, both provided with excellent laboratory facilities, should not be represented, and I sincerely trust that this probable oversight will be remedied.

9. Governmental and Professional Organization of the Public Health Control—National Bureau of Health. The profession is practically unanimous in its opinion concerning governmental and professional organization of the Public Health Control. For years we have labored in vain to establish a National Bureau of Health from which, if established under proper control, would radiate influences far-reaching for the public good. Such department needs representation in the President's cabinet, where

matters of grave importance relating to the public health may be considered, and where the importance of the reciprocal relations of the various departments as represented in the cabinet would soon be recognized and would receive prompt and proper attention. The crying need of the centralization of control of many of the infectious diseases was never more apparent. This question demands the earnest attention of the united medical profession; the co-operation of the various State Medical Societies, and all National Associations of standing, when the common voice of a profession eager to prevent disease, to make its own existence unnecessary and to disseminate knowledge among the masses, shall be heard and its warnings heeded.

Your President recommends that action be taken at this meeting of the Society empowering the President-elect and the Secretaries to take such steps as are needed to further the establishing of a National Bureau of Health, with representation in the President's cabinet, and for this purpose these, our officers, be instructed to enter into correspondence with such medical societies, both State and National, and individuals, as shall to them appear necessary and that they be further requested to report the results of their efforts at the next meeting of the Medical Society of the State of New York.

10. Reciprocal Relations of the State and County Societies. During the year now ended, I have been anxious to impress upon the County Societies of the State, more forcibly than has been done before, the importance of the closest union with the parent-body,—the State Society. For this purpose I have visited many of the County Organizations while in session and have encouraged in every possible way a professional and scientific spirit. This work I could not have accomplished without assistance, which was cheerfully given by many of our most influential and talented members. As a result the social and scientific spirit has received substantial stimulation throughout the State, and in many sections organizations, before apathetic and indolent, have been awakened to renewed energy and activity. The increased representation in the State Society, made possible by the action taken at the last meeting of the Society, will prove an important factor in extending our influence and will do much toward convincing our dependencies that our interests are identical and that they are but the component parts of an organization whose sole objects are the upholding of the medical profession in a firm brotherhood, and the protection of the public. It is the duty of the State Society to strengthen, so far as lies in its power, the local societies here represented. Nothing is appreciated more, I find, than the assistance which we have been able to give in the scientific work of the meeting. Colleagues coming from outside have considerable influence in stimulating individual members to healthy work while the social element is thereby fostered.

After thorough investigation of the conditions existing in many of the County Societies of this State, I am prompted to recommend to the State Society at this time the growing importance of adopting some method by which the relations between the branches and our central body shall be strengthened for the good of all concerned. These various bodies struggling to arrange their programs; to incite the individual workers to scien-

tific effort; to prevent deflections from their ranks, due to the glittering and alluring promises of those who are anxious to organize rival associations, have nobly withstood the test. The time is ripe for assistance. Your president therefore recommends that at this meeting a committee of two from each judicial district of the State be appointed, to act in concert with the officers of the County Societies within the separate districts, for the purpose of assisting in all matters relating to the growth, the social activity and the scientific work of the included societies. These various committees representing the Judicial Districts of the State should report the results of their labor, with such other information acquired in the discharge of their duties, at the next meeting of this Society. Let this committee still further learn whether the profession of the State demands the abolition of the delegate system in this Society and the substitution of a more democratic method of electing permanent members. This is an important matter and demands the thoughtful consideration of a sentiment which is abroad in favor of greater liberality in the admission of members to the State Society.

The State recognizes all who have complied with the laws regulating the practice of medicine as legally qualified practitioners, and does not discriminate in favor of or against any one school. We know no pathy; dogmas have long since faded from our memories. Let us continue to exert our influence in favor of the unification of the profession, not only of this State, but of the entire country. The advantages of unification we need not now consider. Our doors are open to all who practice rational and natural medicine; all who are willing to discard dogma, and who have given the State proof of proficiency and are of good moral character. Let us remind the societies throughout the State that only by encouraging a liberal spirit, and by receiving into their ranks those whom the law has recognized as qualified to practice physic, can we gain the influence which we ought to wield.

11. The Relations of the Medical Society of the State of New York to the National Profession. At this time it seems expedient that I call your attention to the fact that at the last meeting of the American Medical Association, this national and representative body made important changes in its organic laws and has been practically reorganized upon a broad and liberal basis. The prime factor in the disorganization of the regular profession of this State, a disagreement upon a point of ethics, has become a dead issue, and the code to which many true and tried practitioners have consistently clung has, because of changed conditions and the liberal spirit of the profession, been practically relegated to oblivion.

Dr. Reed, in his address before the American Medical Association, said: "The Committee on Reorganization, under the restrictions of the resolution creating it, has very properly left undisturbed the existing rules of conduct. These, if construed to have a fundamental importance and if vigorously enforced as they now stand, would disintegrate the Association in a single day. This reason, and others already given, confirm me in the conviction that such rules should be either amended or abrogated. Or, if reaffirmed, it should be by general resolution and endorsing their underlying principles, but disclaiming the present applicability of their details."

A further extract from Dr. Reed's paper expresses, I believe, the sentiments of the profession of the entire country: "This action (the opprobrious excommunication for the time being of the entire profession of the great Empire State), viewed impartially after the lapse of twenty years, becomes the more extraordinary when it is observed that similar action was never taken with regard to Massachusetts, or Rhode Island, or Mississippi, the societies of neither of which had ever adopted prescribed rules of conduct; nor with regard to California or Illinois or Colorado, each of which had by overt act if not by open declaration so far as this rule is concerned at least taken an equally noncomformist position."

The committee to whom was referred the duty of reporting upon a plan of reorganization of the American Medical Association, in an appended argument says, "No successful organization of the profession is possible without the mutual co-operation of the National and State Societies." In the light of these candid and official declarations, it would seem that the American Medical Association appreciates the fact at this time that the Medical Society of the State of New York is, as it always has been, an important factor in medical matters in this State and country; that without the unification of the medical profession of this great Empire State, in a beneficent and catholic union, serious impediments are placed in the way of its influence and progress. It is equally true that no further advance in laws directly affecting the medical profession of this State can be made without unity in the ranks of the profession.

A thorough study of this subject leads me to the conclusion that the unification of the regular profession is demanded, not only by the profession, but by the thinking public, and that a reorganization can readily be brought about if reason shall prevail. This must be accomplished without the loss of identity or individuality of this time-honored Society, with dignity and without the sacrifice of principle. There being no vital principle upon which the profession is at present divided, all these conditions can be satisfied. Let us remember that in the harmonizing of all elements we must be guided by the same breadth of action which has characterized this Society for almost a century.

The time has come for a final effort, which shall have for its object the gathering of the profession of this State under a single banner upon a liberal platform and with representation in the American Medical Association. Believing this to be true, after due consideration and consultation, it was decided to recommend at the meeting of the Medical Society of the County of New York the appointment of a committee of five, to confer with a committee of equal number representing the New York County Medical Association, for the purpose of arranging, if possible, the details of some method by which a union of the two societies might be accomplished. It was thought expedient to do this because the State Association has its greatest strength in the County of New York, and it was hoped that some plan might be there suggested from which would follow the ultimate amalgamation of the regular profession of the State included in the membership of the Society and the Association. The organic law of the State Association makes it impossible for County Societies to act independently in such matters. The County Association passed a reso-

lution expressing itself in favor of a union of the State profession, and recommended to the State Association the appointment of a committee on conference in case the Medical Society of the State of New York shall appoint a similar committee.

The recommendations which I am about to make seem justified at this time, because of the encouragment received by the reorganization upon a broad platform of the American Medical Association; because it has become evident that the National body appreciates the injustice done to the Medical Society of the State of New York by its excommunication during so many years; because of a growing desire for amalgamation by individual and influential members of the profession in this State, representing over thirteen thousand consistent and conscientious workers, who fail to find any underlying principle of sufficient importance to justify the existing division; because of the influence which would be gained in the settlement of vital questions affecting the public welfare; and finally, because of the undignified and hopeless position of a noble profession divided against itself without reason and justice. If failure results, let the responsibility rest where it belongs; we shall continue as before in the ascendency, full of our original spirit.

Therefore, I recommend that the Medical Society of the State of New York appoint a committee of five, to confer with an equal number representing the New York State Medical Association, for the purpose of formulating a plan which shall have for its object the reorganization of the regular profession of this State, which body shall be in affiliation with the American Medical Association, and that the committee report the result of its labors at the next meeting of the Medical Society of the State of New York. In the event of the failure of the New York State Medical Association to appoint such a committee, or if the committees should fail to agree upon a plan of reorganization, the committee appointed by the Medical Society of the State of New York shall have full power, if it deems it expedient, to represent this Society before the American Medical Association, and the Secretary of this Society shall, if the majority of the committee desires, provide the individual members with credentials of delegates to the American Medical Association. The method of election or appointment of the committee representing this Society shall be decided by the committee to which the President's Inaugural Address shall be referred, and shall be ratified, as are all recommendations, by a vote of the Society.

12. Virchow Celebration. In 1872 this Society honored itself by electing to honorary membership Rudolph Virchow, one of the greatest and most active workers of modern times. Virchow's benign influence in medicine during the past fifty years has been felt in all corners of the earth. He has lived to enjoy the fruit of his labors. Time has dealt kindly with this wonderful student. At eighty he is still bright and active. During the year just ended, the scientific world celebrated in a fitting manner his eightieth birthday. Envoys from all parts of the world gathered in Berlin to convey to this modest man congratulations and express the appreciation of the lay and professional world of his great achievements. At this, the first meeting of the Society since the celebration of Virchow's eightieth birthday, I would suggest that we tender this honored member,

through the Secretary, the congratulations of this Society and express to him our appreciation of his work.

13. Rockefeller Institute. During the past year, through the generosity of Mr. John D. Rockefeller, an institute has been established for the purpose of furnishing facilities for original investigation under the guidance of a number of men eminent in medicine. The work has been commenced in an unpretentious way; the funds are expended in directions that seem to offer the best prospects of telling results in elucidating problems of the greatest importance to the profession. It is to be hoped that all the medical schools of this State will be represented among the workers to whom are referred questions for investigation by the governing board.

It is also encouraging that the medical profession is represented by two of its noted members on the Board of Trustees of the Carnegie Institute, which is to be richly endowed by the philanthropist whose name has been carried to all corners of the civilized world by his boundless charity. We shall look to this source for the solution of many problems which shall result in the saving and prolongation of human life.

Deaths During the Past Year. Our membership has suffered the loss by death during the year just closed of eight of its permanent members. Two of these were among our oldest members, Dr. James V. Kendall, of Baldwinsville, and Dr. J. Mortimer Crawe, of Watertown. Dr. Kendall entered the Society in 1856, and at the time of his death, on August 4th, at the age of eighty-three, was its oldest member. He was a sincere friend and an honest practitioner. Dr. J. Mortimer Crawe, who died in Watertown, was considered by all who knew him a type of the sturdy family physician with excellent judgment, determined, with an honesty of purpose that was never questioned. He was mourned by a large circle of friends in and out of the profession.

Dr. Albery Leary Gihon, a distinguished surgeon of the United States Navy, died in New York City on November 17th of last year, at the age of sixty-nine years. Dr. Gihon was interested in our Society; many of us will remember him with pleasure as he appeared at our semi-annual meeting in October, full of his native wit and to all appearances in the enjoyment of good health. In 1893 he was senior medical officer of the Navy, and in 1895 was placed on the retired list with the rank of Commodore. The last years of his life he spent in New York. He was a genial gentleman, a ready and favorite speaker and a loyal friend.

I now declare this, the Ninety-sixth Annual Meeting of the Medical Society of the State of New York, open for the reception and consideration of scientific contributions and the transaction of business.

The following committee was appointed to consider the recommendations contained in the Address: Frank Van Vleet, of New York; William S. Ely, of Rochester; Charles Stover, of Amsterdam.

THE PRESIDENT announced the following committees:

*Business Committee:* Nathan Jacobson, Syracuse; George R. Fowler, Brooklyn; William C. Krauss, Buffalo.

*Committee on Credentials:* O. D. Ball, Albany; H. B. Hawley, Syracuse; Luzerne Coville, Ithaca.

*Committee on Nominating Candidates for Vacancies on the State Board of Medical Examiners:* Carlos F. MacDonald, New York; H. D. Wey, Elmira; J. W. Whitbeck, Rochester; William Browning, Brooklyn; F. H. Stephenson, Syracuse.

The latter committee subsequently reported the following for these vacancies: A. Walter Suiter, of Herkimer, and George Ryerson Fowler, of Brooklyn; alternates, James D. Spencer, of Watertown, and H. A. Fairbairn, of Brooklyn; which report was accepted and adopted.

THE SECRETARY presented the names of the following applicants for permanent membership, which, on reference to the Committee of Nomination, were recommended and duly elected on compliance with the By-laws: John W. Brannan, A. Edward Davis, Edward Bradford Dench, Bache McEvers Emmet, Eugene Fuller, Rowland G. Freeman, George B. Fowler, Ramon Guiteras, James E. Kelly, Robert Lewis, Jr., Francis H. Markoe, Alexander E. Macdonald, James F. McKernon, Lewis K. Neff, Henry S. Norris, Edward S. Peck, James Pedersen, Henry S. Stearn, John Vander Poel, Frederick Whiting, all of New York; J. M. Clayland, William Simmons, Brooklyn; George B. Broad, R. C. McLennan, Dwight H. Murray, Sargent F. Snow, F. H. Stephenson and Ely Van de Warker, of Syracuse; F. H. Brewer, Morris J. Davies, of Utica; William L. Conklin, of Rochester; John Parmenter, Buffalo; Charles J. Bacon, Fulton; Merritt W. Barnum, Ossining; Henry L. Furbeck, St. Johnsville; H. A. Gates, Delhi; H. F. Gillette, Cuba; James Z. Hunt, Lowville; J. W. Huntington, Mexico; John H. Jewett, Canandaigua; William V. V. Mabon, Ogdensburgh; C. Howard Travell, Troy.

The reports of Standing Committees and of the State Board of Medical Examiners were presented by the Chairmen and accepted. [See Reports.]

The report of the Committee on Prize Essays, by Dr. Jacobi, contained a recommendation of awarding a prize for a successful essay, which was adopted, the author of the essay being Dr. Lucien Howe, of Buffalo.

THE TREASURER presented his report, which was referred to an Auditing Committee: Drs. Wendell C. Phillips, F. W. Marlow and E. B. Angell, who subsequently reported finding it correct.

DR. FRANK VAN FLEET offered a resolution directing the Committee on Legislation to present these facts to the Legislature in opposition to the pending act to legalize the practice of osteopathy: That osteopathy is now legal in the State of New York in the hands of licensed practitioners and requires no regulation; that a class of people calling themselves osteopaths seek not the right to introduce a new method but the right to treat disease without complying with the laws restricting all other practitioners; and that the medical laws of the State were enacted for the protection of the community and should apply to all practitioners or to none. Carried unanimously.

A communication from the Medical Association of the Greater City of New York, with regard to the suppression of quackery, was received and referred to the Committee on Legislation.

DR. H. A. FAIRBAIRN, of Brooklyn, on behalf of the Medical Society of the County of Kings, offered a substitute for Section 12, Chapter IV, of the By-laws, providing for an Executive Committee, consisting of the President, Vice-President, Secretary and Treasurer, and one member from each

of the judicial districts, to take action to increase interest in the Society throughout the State; to build up County Medical Societies; to confer with the Committee on Legislation; to act for the Society during adjournment; and to make an annual report.

This was referred, on motion of Dr. H. D. Wey, to the Committee on the President's Address, as it contained a cognate recommendation.

Dr. Edward D. Fisher, of New York, offered a resolution: Protesting against the proposed Lunacy Bill, which removes all power from the Boards of Managers and centralizes it in the Lunacy Commission; believing that this would lower the medical standards of the State Hospitals. Seconded by Dr. E. B. Angell, and adopted unanimously.

The Business Committee then took up the program of the meeting.

Dr. Thomas P. Scully, of Rome, read a paper, "Goitre: Medical and Surgical Treatment."

Discussion by Dr. Frank S. Low, of Pulaski, and the author.

Dr. M. J. Lewi, of New York, read a paper, "What Should Be Done with the Professional Midwife?"

Discussion by Drs. C. F. Timmerman, of Amsterdam; Francis E. Fronczak and Lucien Howe, of Buffalo; A. Jacobi, of New York; Charles C. Henry, of Brooklyn, and the author, on whose motion the matter was referred to the Committee on Legislation.

Dr. W. S. Ely, of Rochester, read a paper, "Human Asymmetry."

Discussion by Drs. H. R. Hopkins and Lucien Howe, of Buffalo, and Carlos F. MacDonald, of New York.

Dr. Arthur G. Root, of Albany, read a paper, "A Case of Sarcoma of the Tonsil."

Discussion by Drs. R. H. M. Dawbarn and A. Jacobi, of New York; A. T. Bristow, of Brooklyn, and Nathan Jacobson, of Syracuse.

Dr. Charles P. Noble, of Philadelphia, Pa., read a paper, "The Treatment of Pelvic Suppuration."

Discussion by Dr. W. G. Macdonald, of Albany, and the author.

On motion of Dr. Whitbeck a vote of thanks was extended to Dr. Noble for his valuable communication.

First Day.—*Afternoon Session*

The Society reconvened, the Vice-President, Dr. Lanehart, in the chair, and resumed the scientific program.

Dr. Thomas R. Pooley, of New York, read a paper, "The Sideroscope."

Dr. John Van Der Poel, of New York, read a paper, "Gonorrhœa of the Prostate."

Dr. John O. Roe, of Rochester, read a paper, "Fractures of the Nose."

Discussion by Drs. Leonard Webber and Wendell C. Phillips, of New York, and the author.

Dr. Sargent F. Snow, of Syracuse, read a paper, "The Constitutional State versus Catarrhal Deafness."

Discussion by Drs. Wendell C. Phillips and A. Jacobi, of New York, and John O. Roe, of Rochester.

Dr. Edward B. Angell, of Rochester, read a paper, "The Educational Management of the Neurasthenic."

Discussion by Dr. E. D. Fisher, of New York.

Dr. Mary N. Dixon Jones, of New York, read a paper, "Discoveries in Pathology."

Dr. C. H. Richardson, of Albany, read a paper, "A New Method of Bisecting the Uterus in Abdominal Hysterectomy."

Dr. E. F. Brush, of Mount Vernon, read a paper, "An Epidemic of Typhoid Fever in the Backwoods of Maine."

Dr. A. T. Bristow, of Brooklyn, read a paper, "A Case of Strangulated Hernia of the Left Ovary and Tube."

Discussion by Dr. A. Jacobi.

Dr. William C. Krauss, of Buffalo, read a paper, "Toxic Dosage in the Treatment of Some Nervous Diseases."

Discussion by Drs. H. R. Hopkins, A. Jacobi and Lorenzo Hale.

Dr. Carl Beck, of New York, read a paper, "The Pathology of the Tissue Changes Caused by the Roentgen-rays."

Discussion by Dr. S. L. Elsner, of Rochester.

Dr. Edward S. Peck, of New York, read a paper, "Glioma of the Retina."

Dr. Lucien Howe, of Buffalo, read a paper, "On the Position of the Eyes at Rest."

Discussion by Dr. Francis Valk, of New York.

The President announced the following as appointed to represent the Society at the hearing before the Legislative Committee on the Osteopathy Bill: Drs. A. Jacobi, D. B. St. John Roosa, J. D. Bryant, E. D. Fisher, William Browning, A. T. Bristow, S. B. Ward, A. Vander Veer, William Mabon, J. L. Heffron, F. S. Low, J. O. Roe, E. B. Angell and Roswell Park.

The Committee of Nomination was announced as follows:

*Appointed by the President.*—William Warren Potter, of Buffalo.

*First District.*—J. Milton Mabbott, of New York.

*Second District.*—H. B. De Latour, of Brooklyn.

*Third District.*—Willis G. Macdonald, of Albany.

*Fourth District.*—William C. Wood, of Gloversville.

*Fifth District.*—F. H. Stephenson, of Syracuse.

*Sixth District.*—Charles G. Wagner, of Binghamton.

*Seventh District.*—A. L. Beahan, of Canadaigua.

*Eighth District.*—Francis C. Fronczak, of Buffalo.

### First Day.—*Evening Session*

The Society reconvened at 8.30 P. M., at the call of the President.

Dr. A. D. Lake, of Gowanda, read a paper, "The Civilized Indian: His Physical Characteristics and Some of His Diseases."

Dr. Ernest Wende, of Buffalo, read a paper, "The Smallpox Problem."

Discussion by Drs. J. Milton Mabbott, of New York, and C. L. Stiles, of Owego.

The remainder of the evening was devoted to a Symposium on Paresis.

Dr. Arthur W. Hurd, of Buffalo, opened the discussion on the "Etiology."

Dr. Francis X. Dercum, of Philadelphia, Pa., read a paper, "The Early Diagnosis of Paresis."

Dr. Charles G. Wagner, of Binghamton, read a paper, "Comparative Frequency of Paresis."

Dr. Edward Cowles, of Boston, Mass., read a paper, "Treatment of Paresis: Its Limitations and Expectations."

On motion of Dr. E. B. Angell, the thanks of the Society were extended to these gentlemen who had come from a distance and had contributed so much to the interest of this session.

### Second Day.—*Morning Session*

The meeting was called to order by the President at 9.45 A. M.

Dr. Charles Stover presented the report of the Committee on the President's Inaugural Address:

The Committee appointed to consider the recommendations of the President, in his Inaugural Address, respectfully reports as follows:

First: That the Medical Society of the State of New York extends thanks to the Medical Society of the County of New York for the reception and many attentions during the semi-annual meeting held in New York City in October last.

Second: That the question of holding a semi-annual meeting devoted entirely to scientific medicine, in New York or elsewhere in 1902 and subsequently, be left to the judgment of the President-elect and the *Commitia Minora.*

Third: That the question of a separate examination in internal medicine to be held by the State Board of Medical Examiners be referred to the Regents.

Fourth: That the questions involved in Koch's paper at the London Tuberculosis Congress, upon the communicability of Bovine Tuberculosis, invites still further experimentation in this field before any conclusions can be drawn that would modify existing methods for dealing with the disease.

Fifth: That we recommend to the various Health Boards of the State the work of the Milk Commission of the Medical Society of the County of New York for adoption and imitation so far as may be practicable.

Sixth: That we favor the recommendation looking to the establishment of a National Board of Health with representation in the President's cabinet.

Seventh: That we approve of the appointment of a committee of two from each judicial district, to act in concert with the officers of the County Societies within the separate districts, for the purpose of assisting in all matters relating to the growth, the social activity and the scientific work of the included societies.

Referring in this connection to the communication from the Medical Society of the County of Kings, it is in our judgment inadvisable to change the By-laws of the Medical Society of the State of New York relating to the *Commitia Minora* inasmuch as the recommendation of the President covers the questions raised.

Eighth: That we approve of the recommendation that the Medical Society of the State of New York tenders to Rudolph Virchow the congratulations of the Society on his eightieth birthday and expresses to him its appreciation of his work.

Ninth: We recommend that the Secretary and the Publishing Committee be empowered in their discretion to publish in the Transactions of this Society the papers read at the semi-annual meeting held in New York in October, 1901.

Tenth: Your Committee has most carefully considered the final recommendation of the President's Inaugural Address, which reads as follows:

"That the Medical Society of the State of New York appoint a committee of five, to confer with an equal number representing the New York State Medical Association, for the purpose of formulating a plan which shall have for its object the reorganization of the regular profession of this State, which body shall be in affiliation with the American Medical Association, and the committee report the result of its labors at the next meeting of the Medical Society of the State of New York. In the event of failure of the New York State Medical Association to appoint such a committee, or if the committee should fail to agree upon a plan of reorganization, the committee appointed by the Medical Society of the State of New York shall have full power, if it deems it expedient, to represent this Society before the American Medical Association, and the Secretary of this Society shall, if the majority of the committee desire, provide the individual members with credentials to represent this Society in the American Medical Association."

Your Committee gives this recommendation its unqualified approval. In carrying out the provisions of this recommendation, we suggest that the gentleman from whom it emanated be the Chairman of the Committee and empowered to associate with himself four representative members of this Society.

All of which is respectfully submitted.

FRANK VAN FLEET,
WILLIAM S. ELY,
CHARLES STOVER,
*Committee.*

DR. WILLIAM WARREN POTTER moved the adoption of the report in its entirety, and that it be spread upon the minutes in full and communicated to the persons interested. Carried unanimously.

A communication was presented from the President of the Fourteenth International Congress of Medicine to be held in Madrid in April, 1903, inviting this Society to send a delegate. The communication was received and referred to the Committee on Nomination.

DR. GEORGE THOMAS JACKSON, of New York, read a paper, "Ringworm: A Note on Its Treatment."

Discussion by Dr. H. C. Baun, of Syracuse.

DR. FREDERICK SEFTEN, of Auburn, read a paper, "A Case of Epilepsy, with Possible Medicolegal Complications."

Discussion by Dr. William Browning, of Brooklyn.

DR. JOHN L. HEFFRON, of Syracuse, read a paper, "Acute Lymphatic Pseudoleukemia, with Report of a Case and Autopsy."

Discussion of Dr. Thomas R. Brown, of Baltimore.

DR. THOMAS R. BROWN, of Baltimore, Md., read a paper, "The Changes of the Leucocytes in Disease as an Aid to Diagnosis and Prognosis."

On motion of Dr. Heffron, the thanks of the Society were extended to Dr. Brown for his valuable contribution.

DR. EDGAR A. VANDER VEER, of Albany, read a paper, "An Unusual Case of Abscess of the Liver."

DR. E. W. MULLIGAN, of Rochester, read a paper, "Gunshot Wounds of Liver, with Report of a Case."

DR. JOHN W. WHITBECK, of Rochester, read a paper, "The Surgical Treatment of Peritoneal Tuberculosis."

Discussion by Dr. John H. Doughty, of Matteawan.

DR. JOHN B. HARVIE, of Troy, read a paper, "Unusual Herniæ, with

Report of a Complete Herniæ of the Bladder Complicating a Strangulated Herniæ, requiring Resection of the Bowels.''

Discussion by Dr. R. H. M. Dawbarn, of New York.

The President, Dr. Henry L. Elsner, of Syracuse, delivered the Annual Address, taking for his theme, ''Modern Methods of Diagnosis.''

On motion of Dr. J. W. Whitbeck, the Society extended a vote of thanks to the President for the very important contribution he had made, and which contributed so largely to the success of the annual Meeting.

### Second Day.—*Afternoon Session*

The Society reconvened at 2.30, at the call of the Vice-President.

Dr. Samuel M. Brickner, of New York, read a paper, ''A New Symptom in the Diagnosis of Dystocia due to a Short Cord.''

Discussion by Dr. George Seymour, of Utica.

The next order was a Symposium of Diseases of the Pancreas.

Prof. R. H. Chittenden, of New Haven, Conn., opened the Symposium with a paper on the ''Physiology of Pancreatic Diseases.''

Dr. W. S. Thayer, of Baltimore, Md., read a paper, ''Diagnosis of Diseases of the Pancreas.''

Dr. Roswell Park, of Buffalo, read a paper, ''Surgery of the Pancreas.''

Dr. George Blumer, of Albany, read a paper, ''Pathology of Pancreatic Diseases.''

Dr. Joseph C. Bloodgood, of Baltimore, Md., read a paper, ''Clinical Indications for Surgical Interference in Acute Pancreatitis.''

On motion, the thanks of the Society were extended to the gentlemen who had come from a distance and contributed so materially to the interest of this meeting.

Dr. Denslow Lewis, of Chicago, read a paper, ''The Traumatism of Pregnancy.'' A vote of thanks was extended to Dr. Lewis.

Dr. Arthur W. Elting, of Albany, read a paper, ''Tendon Transplantation in the Treatment of Paralytic Deformities.''

Discussion by Dr. R. H. M. Dawbarn, of New York.

Dr. J. Milton Mabbott, of New York, read a paper, ''Pneumoglactocele of the Breast, with an Unidentified Organism.''

Dr. Rowland G. Freeman, of New York, read a paper, ''A Simple Method of Determining the Percentage of Milk in Home Modifications.''

Dr. George Seymour, of Utica, read a paper, ''Puerperal Hemorrhage.''

Discussion by Dr. J. Milton Mabbott, of New York.

Dr. Thomas R. Pooley, of New York, read a paper, ''Malignant Tumors of the Periphery, Their Pathology and Treatment.''

The President announced the following committees for the Judicial Districts, to act with the officers of the County Medical Societies, as provided in the report on the Inaugural Address:

*First District.*—Drs. A. Jacobi and D. B. St. John Roosa, of New York.

*Second District.* — Drs. George R. Fowler and William Maddren, of Brooklyn.

*Third District.*—Drs. A. Vander Veer and Arthur G. Root, of Albany.

*Fourth District.*—Dr. William Mabon, Ogdensburgh, and Dr. Eugene Beach, Gloversville.

*Fifth District.* — Dr. Nathan Jacobson, Syracuse, and Dr. James D. Spencer, Watertown.

*Sixth District.*—Dr. Henry T. Dana, Cortland, and Dr. R. H. Phelps, Norwich.

*Seventh District.* — Dr. W. S. Cheesman, Auburn, and Dr. W. S. Ely, Rochester.

*Eighth District.*—Drs. Roswell Park and William C. Krauss, of Buffalo.

The Annual Dinner occurred in the evening at the Hotel Ten Eyck, and was very largely attended.

THIRD DAY.—*Morning Session*

The meeting was called to order by the Vice-President.

DR. D. H. WIESNER, of New York, read a paper, "An Unique Case of Double Dacryo-Adenitis."

DR. REYNOLD W. WILCOX, of New York, read a paper, "The Treatment of Pneumonia."

DR. HEINRICH STERN, of New York, read a paper, "Obesity of Adolescence."

DR. REGINALD H. SAYRE, of New York, read a paper, "Observations on Broken Necks."

THE SECRETARY read a petition from the Medical Society of the County of Lewis, requesting the discipline of two members for unprofessional conduct, which was referred to the Committee on Ethics.

The report of the Committee of Nomination was presented by Dr. William C. Wood as follows:

*For President:* Henry Reed Hopkins, of Buffalo.
*For Vice-President:* William A. Moore, of Binghamton.
*For Secretary:* Frederic C. Curtis, of Albany.
*For Treasurer:* O. D. Ball, of Albany.
*For Committee of Arrangements:* Herman Bendell, Albany; William J. Nellis, Albany; Reynold W. Wilcox, New York; Howard Van Rensselaer, Albany; Francis E. Fronczak, Buffalo.
*For Committee on By-laws:* H. D. Wey, Elmira; Nathan Jacobson, Syracuse; F. C. Curtis, Albany.
*For Committee on Hygiene:* J. L. Heffron, Syracuse; Joseph D. Craig, Albany; George B. Fowler, New York; J. M. Van Cott, Brooklyn; M. A. Veeder, Lyons; J. H. Pryor, Buffalo; D. V. Still, Johnstown.
*For Committee on Legislation:* Frank Van Fleet, New York; Arthur G. Root, Albany; Ernest Wende, Buffalo.
*For Committee on Ethics:* A. T. Bristow, Brooklyn; Edward B. Angell, Rochester; E. S. Willard, Watertown.
*For Committee on Prize Essays:* A. Jacobi, New York; J. M. Mosher, Albany; Smith Baker, Utica.
*For Committee of Publication:* F. C. Curtis, Albany; Daniel Lewis, New York; William C. Krauss, Buffalo; O. D. Ball, Albany.
*For Delegates to the Fourteenth International Congress of Medicine, at Madrid, Spain:* Lucien Howe, Buffalo; Ramon Guiteras, New York.
*For Delegate to the New Jersey State Medical Society:* E. F. Brush, Mount Vernon.
*For Delegates to the Ontario Medical Society:* T. H. Halstead, Syracuse; Irving M. Snow, Buffalo; William Davis, Gloversville.

*For Honorary Membership:* B. Merrill Ricketts, Cincinnatti, Ohio; J. Collins Warren, Boston, Mass.

*For Eligibility to Honorary Membership:* R. H. Chittenden, New Haven, Conn.; Edward Cowles, Boston, Mass.; Francis X. Dercum, Philadelphia, Pa.

Respectfully submitted.

WILLIAM WARREN POTTER,
*Chairman.*
WILLIAM C. WOOD,
*Secretary.*

The report was accepted, and on motion, the nominees for the various positions named were duly elected.

THE PRESIDENT announced his associates on the committee to confer with a committee representing the New York Medical Association, he himself as provided in the report on the Inaugural Address being Chairman; the committee is as follows: Henry L. Elsner, Syracuse; A. Jacobi, New York; A. Vander Veer, Albany; A. M. Phelps, New York; George R. Fowler, Brooklyn.

DR. HERMAN BENDELL moved a vote of thanks to the retiring President, and the other officers and committees of the Society, for the very successful meeting and for the effective conduct of the affairs of the Society, to which he especially had contributed so much.

THE PRESIDENT made a suitable response, and the Society then adjourned.

FREDERIC C. CURTIS,
*Secretary.*

# MINUTES OF THE SEMI-ANNUAL MEETING

HELD AT THE

ACADEMY OF MEDICINE, NEW YORK CITY

OCTOBER 15 AND 16, 1901

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## FIRST DAY

The meeting was called to order by the President, Dr. H. L. Elsner, who made a few opening remarks.

DR. HEINRICH STERN, of New York, read a paper, "A Contribution to the Pathogenesis of Narcolepsy and Other Forms of Morbid Sleeplessness." Discussion by Drs. E. D. Fisher, A. Jacobi, of New York, and Dr. Kinnear, of Clifton Springs.

DR. JAMES K. COOK, of New York, read a paper, "On the Etiology and Classification of the Cardiac Neuroses, with Special Remarks on Nomenclature." Discussion by Drs. A. Rose and E. D. Fisher, of New York.

DR. ENOCH V. STODDARD, of Rochester, read a paper, "The Official Relation of the Medical Profession to Private Charitable Institutions."

DR. EDWARD D. FISHER, of New York, read a paper, "Cerebral Apoplexy." Discussion by Drs. William Browning, A. Jacobi, William G. Spratling, H. L. Elsner, and the author.

DR. WILLIAM P. SPRATLING, of Sonyea, read a paper, "The Cause and Treatment of Epilepsy." Discussion by Drs. A. Jacobi, L. A. Weigel, Carlos F. MacDonald, and the author.

DR. J. LEONARD CORNING, of New York, read a paper, "Hallucinations: Their Pathogenesis, Clinical Import and Medico-Legal Value." Discussion by Drs. Carlos F. MacDonald, E. D. Fisher, and the author.

DR. WILLY MEYER, of New York, read a paper, "Spinal Anæsthesia." Discussion by Drs. J. Leonard Corning, of New York; Herman Mynter, of Buffalo, and the author.

DR. BRACE W. LOOMIS, of Syracuse, read a paper, "Therapeutics and the Drug Manufacturer."

DR. A. JACOBI, of New York, read a paper, "Prolonged Medication."

DR. J. ELWOOD STUBBERT, of Liberty, read a paper, "Some Notes on the Early Diagnosis and Treatment of Pulmonary Tuberculosis."

DR. MATTHEW D. MANN, of Buffalo, on motion, presented a "Report of the Case of President McKinley." Further contribution to the subject was made by Dr. Herman Mynter, of Buffalo. A vote of thanks was extended to Drs. Mann and Mynter.

DR. J. M. ANDERS, of Philadelphia, Pa., read a paper, "The Association of Pulmonary Tuberculosis with both Primary and Secondary Endocarditis, and the Effect of Valvular Disease upon Lung Tuberculosis." Discussion by Dr. H. L. Elsner.

Dr. Henry C. Coe, of New York, read a paper, "Muscular Atony as an Important Factor in Uterine Displacements." Discussion by Dr. Egbert H. Grandin, of New York.

Drs. Albert Vander Veer and Arthur W. Elting, of Albany, presented a paper, "Abdominal Actinomycosis, with Illustrations and Report of a Case."

Dr. A. M. Phelps, of New York, presented, "Mechanical and Operative Treatment of Hip Disease and Disease of the Spinal Vertebræ, with Practical Demonstration." Discussion by Drs. Wisner R. Townsend, L. A. Weigel, and the author.

Dr. L. A. Weigel, of Rochester, read a paper, "The Advantages of Stereoscopic Radiography." Discussion by Drs. Carl Beck and George G. Hopkins.

Symposium on some of the Diseases of the Liver and Bile Passages:

Dr. Charles G. Stockton, of Buffalo, read a paper, "The Diagnosis of Gall-Stones."

Dr. Richard C. Cabot, of Boston, Mass., read a paper, "Courvoisier's Law."

Dr. B. Farquhar Curtis, of New York, read a paper, "The Infections of the Gall Bladder and Bile Ducts."

Dr. L. S. Pilcher, of Brooklyn, read a paper, "Intestinal Obstruction due to Gall-Stones."

Dr. S. J. Mixter, of Boston, Mass., read a paper, "Technique of Gall Bladder and Duct Operations."

Dr. C. L. Gibson, of New York, read a paper, "Cholecystectomy."

Dr. Simon Flexner, of Philadelphia, Pa., read a paper, "Syphilis of the Liver."

Dr. G. R. Fowler, of Brooklyn, read a paper, "Tumors of the Liver."

Discussion of the papers of the Symposium by Drs. Joseph D. Bryant and Robert H. M. Dawbarn, of New York. On motion of Dr. Jacobi, a vote of thanks was voted to Drs. Anders, Cabot, Mixter and Flexner.

## Second Day

Dr. W. E. Ford, of Utica, read a paper, "Medical Aspects of Appendicitis." Discussion by Drs. Herman Mynter, of Buffalo; Robert T. Morris, of New York; B. O. Kinnear, of Clifton Springs; Bond Stow and Homer Wakefield, of New York, and the author.

Dr. Carlos F. MacDonald, of New York, read a paper, "The Etiological Potency of Heredity in Mental Diseases." Discussion by Drs. William Mabon, of Ogdensburgh, and E. D. Fisher, of New York.

Dr. W. H. Thompson, of New York, read a paper, "The Pathology and Treatment of Migraine." Discussion by Dr. A. Jacobi.

Dr. Arthur Booth, of Elmira, read a paper, "Report of a Case of Non-Traumatic Perinephritic Hemorrhage."

Dr. W. G. Macdonald, of Albany, read a paper, "Morcellement and Bisection of the Uterus in Complicated Abdominal Hysterectomy." Discussion by Dr. Howard A. Kelly, of Baltimore.

Dr. George M. Edebohls, of New York, read a paper, "The Technique of Nephropexy."

Dr. Howard A. Kelly, of Baltimore, Md., read a paper, "Method of Incising, Searching and Sutering the Kidney for Stone." Discussion by Dr. A. Vander Veer, of Albany.

Drs. F. C. Curtis and H. L. K. Shaw, of Albany, presented a paper, "A Smallpox Epidemic in an Orphanage."

Dr. A. L. Beahan, of Canandaigua, read a paper, "The Immediate Repair of Injuries of Parturition." Discussion by Drs. Charles Jewett, of Brooklyn; M. C. Potter, of Rochester, and the author.

Dr. D. B. St. John Roosa, of New York, read a paper, "The Present Status of Ophthalmic Science and Art."

Dr. F. H. Bosworth, of New York, read a paper, "Are the Faucial Tonsils to be regarded as Organs of the Body?" Discussion by Dr. Robert C. Myles, of New York.

Dr. J. C. Wilson, of Philadelphia, Pa., read a paper, "Observations on the Treatment of Croupous Pneumonia." Discussion by Drs. S. B. Ward, of Albany; John Hunter, of Toronto, by invitation, and the author.

Dr. T. H. Halsted, of Syracuse, read a paper, "The Early Diagnosis and Treatment of Acute Mastoditis." Discussion by Dr. J. E. Sheppard, of New York.

Dr. Robert Lewis, Jr., of New York, read a paper, "History and Presentation of a Case of Cerebral Abscess complicating Chronic Otitis Media."

Dr. B. Farquhar Curtis, of New York, read a paper, "Some Conditions Antecedent to Cancer of the Breast."

Dr. Robert T. Morris, of New York, read a paper, "Ligation of the Abdominal Aorta for Aneurism." Discussion by Dr. A. T. Bristow, of Brooklyn.

Dr. I. H. Levy, of Syracuse, read a paper, "A Case of Intermittent Claudication terminating in Gangrene." Discussion by Dr. H. L. Elsner, of Syracuse.

Dr. A. Edward Davis, of New York, read a paper, "The Beneficial Effect upon the Eyes from the Use of the Stereoscope."

Dr. F. Tilden Brown, of New York, read a paper, "The Possible Curative Effect of Peritoneal Anastomosis in Ascites due to Liver Cirrhosis, with Presentation of a Case."

A Reception on Wednesday evening, given by the Medical Society of the County of New York, concluded the Semi-annual meeting.

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There were registered at the semi-annual meeting, 363 members, delegates and members by invitation.

At the annual meeting there was a registered attendance of 314 delegates and 131 permanent members; also of 25 members by invitation, the latter including but a part of those thus attending the meeting.

The next annual meeting of the Society will be held in Albany, January 27, 28 and 29, 1903.

# REPORTS

## 1. Treasurer's Report

*The Medical Society of the State of New York in account with the Treasurer.*

| | |
|---|---|
| Balance in Treasury January 30, 1901 | $3792 14 |
| Received from County and other affiliated Societies | 940 00 |
| Received from permanent members, dues and initiation fees | 1975 00 |
| Received from sale of *Transactions* | 347 85 |
| Interest accrued on deposits in Savings Bank | 113 90 |
| Total | $7168 89 |

*Expenditures from January 31, 1901, to January 30, 1902.*

| | |
|---|---|
| Secretary, services and expenses of office | $394 60 |
| Treasurer, services and expenses of office | 167 00 |
| Associate Secretary, services | 350 00 |
| Committee on Legislation, expenses of | 494 62 |
| Champ S. Andrews, legal services | 246 05 |
| *Transactions*, printing of | 1106 46 |
| *Transactions*, expressage on | 161 97 |
| Annual Meeting: Stenographer, messengers, Trunk Line agent, clerical | 127 50 |
| Drs. C. A. L. Reed and A. M. Phelps, expenses coming to meeting | 120 72 |
| Committee of Arrangements, expenses of | 163 50 |
| Semi-Annual Meeting, expenses of | 250 75 |
| Lea Bros. & Co., reprints of Dr. Van Fleet's paper | 161 35 |
| Multi-Mailing C.: Clerical services and stenographer; boxes and transportation | 86 84 |
| Stationery and printing | 270 87 |
| Overpaid dues refunded | 21 00 |
| Insurance and rent of storage loft | 55 00 |
| Total | $4178 23 |
| Balance in Treasury January 30, 1902 | $2990 66 |

## 2. Report of Merritt H. Cash Fund.

| | |
|---|---|
| Interest accrued to date of last report | $212 65 |
| Interest accrued from January 1, 1901, to January 1, 1902 | 25 17 |
| | $237 82 |

The Fund ($500) and interest accrued are on deposit in the Albany Savings Bank.

O. D. Ball,
*Treasurer.*

## 3. Report of the Committee of Publication

*To the Medical Society of the State of New York:*

The volume of *Transactions* for 1901 consisted of an edition of 875 copies, containing 524 pages, costing $1106. Of the 67 papers on the pro-

gram, of the last annual meeting, 46 were printed which, with the anniversary address and prize essay, filled 400 pages, the Society lists taking about 100 pages. There were 31 illustrations, 22 half-tones and 1 colored plate in the volume, all supplied by the authors, making a book of unusual attractiveness and value. There were sent to members 350 copies, to exchanges, libraries and complimentary 130 copies, and sold to county medical societies 167, and to individuals 166 copies. Your committee has again provided for the sale of copies of the next volume to individual members of the profession at $1 a copy with the purpose of securing its wider distribution.

It is not considered by your committee desirable nor practicable that the forthcoming volume for 1902 should vary materially, so far as it may be possible to avoid it, in size or style from those of recent years, which have not much exceeded 500 pages. Inasmuch as the Society has held an additional, semi-annual, meeting during the year at which 43 of 58 papers on the program were read, while the program of this current meeting bears 60 papers, it is evident that only by some process of selection with some change in the customary matter of the volume can the desired size be compassed. It is thought advisable by the committee that for this issue the space usually given to Society lists be reserved for preserving in this compendious form the papers, such of them as can find place, which will make 100 pages additional available, and this with closer printing will admit to a reasonably-sized volume a fair proportion of the papers presented.

F. C. Curtis,
Daniel Lewis,
William Warren Potter,
O. D. Ball,
*Committee.*

### 4. Report of the Committee on Legislation

*To the Medical Society of the State of New York:*

Your Committee takes pleasure in announcing that no laws seriously affecting the medical law were enacted during the last session of the Legislature. Our lists show that during the legislative session of 1901 bills to the number of 379 received the attention of your committee. These bills had relation to the water supply of towns and cities, sewers, food supplies and adulterations, agricultural laws relating to tuberculosis in cattle, contamination of milk supply, use of poisonous materials on food plants, regulation of charitable institutions, health boards, charity and lunacy boards, exemption from taxation of medical institutions, hospitals and their managements, bills providing for the admission of incompetent people to the ranks of the medical profession, and so on. We are pleased to say that in the person of Governor Odell the educational standards of this State found a warm supporter. There were bills which received legislative approval affecting the dental and law requirements, which would have become laws had not the governor refused to sign them. There were bills introduced exempting individuals from the requirements of the Medical Practice Act, but none of these reached the governor; if they had they would probably have received the same treatment the others received.

The only bill affecting the medical law enacted was one which received the approval of the Regents of the University of the State of New York. This amendment to the law gives the Regents power to admit conditionally to the licensing examinations in anatomy, physiology and hygiene, and chemistry, applicants certified as having studied medicine not less than two years of at least nine months each in two different calendar years, in a medical school registered as maintaining at the time a satisfactory standard, providing such applicants are more than twenty-one years of age, of good moral character, have the requisite preliminary education, and pay the fee; the final examinations in surgery, obstetrics, pathology and

diagnosis, therapeutics and practice and materia medica, to be made after having finished the full period of study and having received the medical degree. This measure is fair and just, and received the approval of your committee.

This Society adopted a resolution at its last meeting, asking the Legislature to define the practice of medicine. We did not succeed in securing this from the Legislature, but a conviction has been secured by the Medical Society of the County of New York, in the case of a person who treated another for a fistula in ano with the application of electricity, and without the use of medicines and drugs, which sufficiently defines the practice of medicine for the present. Your committee would urge that no attempt be made to secure the enactment of any amendments to the present medical law unless the proposed enactment receive the approval of the Regents.

The bill which your committee opposed most strenuously was one to legalize the practice of osteopathy. We were put to an expenditure of considerable time, money and energy to secure the defeat of this measure, but succeeded in keeping it from being reported. This measure has been introduced again, and we are informed a great effort will be made to secure its passage. We all fall into the error of designating this effort as one to *legalize* the practice of osteopathy. Osteopathy is simply a term used by certain people who claim to be able to cure disease by massage and manipulation. The employment of this, and all other known methods of treating disease, is legal in the State of New York, if conducted by licensed physicians. Every year bills are introduced in the Legislature exempting somebody, for some particular reason, from the operation of the laws governing practitioners of medicine, dentistry, law, and so on. The efforts of the so-called osteopaths is simply that of an organized body, small it is true, to gain the right to treat disease by a particular method after complying with a standard which is about half as strict as that required of physicians generally. If this method, which its adherents term osteopathy, had in it any merit which made it superior to other methods, osteopathic practitioners should be willing to comply with the standard with which physicians generally comply, and set themselves to work to demonstrate the superiority of their methods. Instead of this, they seek the right to practice their method by evading the standards the State has created, and then ask the creation of another standard for their especial benefit. If they succeed the way is opened for the introduction of as many standards as there are people whose fertile brains can devise some peculiar name, or particular method of treating disease, and they will be unlimited.

The aptitude of those who seek to evade beneficient laws to devise schemes for defeating the ends of justice is too well known to warrant argument here; we believe it will only be necessary to point out to the members of the Legislature the true condition of affairs in this case to ensure the defeat of this measure. We take this opportunity of repeating what we have said before: It is only necessary to point out to members of the Legislature the necessity, from a public standpoint, of protecting professional educational standards of this State, in order to defeat this and all other measures which have for their object the evasion of the medical laws. To fully accomplish this it is necessary to have a strong medical society in every county in the State, and one of the most commendable actions this State Society can take is to appoint a committee to undertake the creation of societies in counties in which there are none at present, and to increase the strength of those already in existence.

Respectfully submitted.

FRANK VAN FLEET,
ARTHUR G. ROOT,
ERNEST WENDE.
*Committee.*

### 5. Report of Committee on Prize Essays

*To the Medical Society of the State of New York:*

In regard to the prize essay furnished for this annual session, your committee begs to report that there was only one submitted to it. The essayist will have to be told that he sent his paper too late, indeed only three weeks ago, too late to enable every member of the committee to examine it carefully and embark in those studies that are required for the adjudication of a paper strictly technical and specialistic. Your committee expresses the hope that future committees on prize essays will not be either too lenient or too regardless of the regulations of the Society. Even committees have their rights and duties.

It bears the title: "A Study of the Connective Tissues of the Orbit by a New Method." The conclusions the author arrives at are as follows:

1st. Much confusion has existed in regard to the connective tissues of the orbit, this being due to the difficulty in dissecting the finer fibers and to the confusion of terms employed.

2d. By the employment of stains recently discovered, these fibers can be studied with better results than at any time previously.

3d. By the use of potassium permanganate and oxalic acid, we have still another method, and one of the best, for identifying these connective tissue fibers.

4th. With the assistance of these methods, especially the last, an idea can be gained of the capsule of Tenon, of the insertions of the recti, of the check ligaments, and of other connective tissue in the orbit, which in every way is instructive and in some details is new.

In regard to the subject matter, your committee begs to report that it wished to be sure that the essay submitted to it should contain something sufficiently new to enable it to confer the coveted prize. For that purpose it has studied the literature, mainly that which is quoted by the author, and principally the "Researches on the Human and the Comparative Anatomy of the Motory Apparatus of the Eye," by Dr. Motais, contained in the fifth volume (1885) of the "Archives d'Opthalmologie." They are replete with exact and most painstaking anatomical and histological investigations, and exhausted the intellectual means and methods of seventeen years ago. Now your committee finds in the essay submitted to it a thorough knowledge of its subject, a careful study conducted on partially new lines, and the application of modern and of some individual new methods to the elucidation of a difficult topic. That is why it declares the paper before it worthy of the prize established for such occasions by the Medical Society of the State of New York, and recommends that it should bestow it to the author of the treatise which bears the motto: "Palma non sine pulvere."

[The envelope accompanying the essay bearing this motto contained the name of Dr. Lucien Howe, of Buffalo, to whom the prize was awarded.]

A. Jacobi, *Chairman,*
A. Vander Veer,
Wm. C. Krauss,
*Committee.*

### 6. Report of the State Board of Medical Examiners

*To the Medical Society of the State of New York:*

There were four licensing examinations held in September, January, May and June simultaneously at Buffalo, Syracuse, Albany and New York. 749 candidates appeared for license, the total rejections being 150, or 20 per cent. Before the board representing this Society there appeared 671 candidates, of whom 139, or 20.7 per cent., were rejected; before the homœopathic board there appeared 58 candidates, of whom 6, or 10.3 per cent., were rejected, and before the eclectic board there appeared 20 candidates, of whom 5, or 25 per cent., were rejected. The rejections by topics were

as follows: Anatomy, 61; physiology and hygiene, 68; chemistry, 49; surgery, 46; obstetrics, 52; pathology and diagnosis, 58; therapeutics, practice and materia medica, 46.

Since the creation of the boards 6349 candidates have been examined, of whom 1379, or 21.7 per cent., have been rejected. Under exemptions in the medical laws the Regents have licensed during the year 97 physicians. On recommendation of this board, 14 diplomas issued before the law took effect have been legally indorsed, entitling the holders to register in any county of the State. Statistics from the annual report of Director Parsons for 1900 show the marked superiority of the graduates of New York State medical schools in the licensing tests. From New York State graduates there was an average of one rejected answer paper to three candidates; from graduates of other schools in the United States an average of more than one rejected answer paper to each candidate; and from graduates of foreign medical schools an average of more than two rejected answer papers to each candidate, due partly, perhaps, to ignorance of English.

SEPTEMBER, 1901, EXAMINATIONS. *State Board*—Number of candidates taking partial examination, 98; passed, 94; rejected, 4. One candidate not counted — examination incomplete. *Homœopathic Board* — Number of candidates taking partial examination, 8; passed, 8. *Eclectic Board*—Number of candidates taking partial examination, 1; passed, 1.

WILLIAM WARREN POTTER, *President.*
MAURICE J. LEWI, *Secretary.*

## 7. REPORT OF THE COMMITTEE ON HYGIENE

*To the Medical Society of the State of New York:*

The prominent topics emphasized in the recent reports of your committee continue to be the subjects demanding the attention of the sanitarian. The enormous death-rate from typhoid fever in the State attracts the attention of all well-informed persons to the continued impurity of the water supply of the entire State, to the lack of intelligence and appreciation of this prime necessity of health, to the corresponding want of efficiency as hygienists of our medical profession. That there is more than four times the morbidity and mortality from typhoid fever, in the chief cities of this State, than in the large cities of Europe, is a most humiliating demonstration. Your committee again directs attention to the fact that in the main the responsibility for this disgraceful state of impure water supply, and the consequent loss of time, money, and life from typhoid fever rests upon the medical profession as the same is represented in the Medical Society of the State of New York, and calls upon the several local societies to make this question one of especial study to the end that those in authority may speedily be induced to apply the proper remedy.

The real sanatory problem of the day—than which there has been none more important in history, the prevention and cure of consumption by State control—has made slow but positive progress. The tactics of the enemies of the cause seem to have been to confuse, to distract, to delay, to obstruct by impossible suggestions of help. A State sanatorium for the treatment of cases of incipient consumption was demanded by abundant and conclusive experience, advised by this Society, and this demand was supported by overwhelming public sentiment. The selection of a site furnished the occasion for meddlesome and mischievous suggestions, an artificial activity of some self-styled friends of the cause, and required much patience, wisdom and loyalty on the part of the right-minded members of the board of trustees, in order that a wrong choice might not ruin the enterprise at its beginning. The delay thus caused has been most exasperating, and trying, but has given opportunity of testing how sane the movement is, how imperative is the demand on the part of the people, and

of the futility of attempting to kill that which is demanded in the interests of the public health. Your committee with all emphasis renews and reaffirms what it has heretofore declared as to the importance of this matter, and advises that this Society renew its pledge of confidence and support to the cause of State prevention and cure of consumption in sanatoria as the State's highest duty and most glorious opportunity.

Your committee has given consideration to the recent increase of knowledge regarding the relation of some of the smaller insects to the spread of disease. The role of certain varieties of mosquitoes to the spread of malaria and yellow fever opens a vista for the prevention of these diseases of immense attractiveness and potentiality. It would seem that the near future is to demonstrate that some of the fairest portions of the earth, that have hitherto been thought unsuitable for Anglo-Saxon inhabitation, by reason of malarial endemicity are to be reclaimed, and that modern sanitary science is not only to drive yellow fever from off the earth as it has already been driven from Cuba and Porto Rico, but that by a knowledge of the ague-bearing mosquito, the sphere for Anglo-Saxon residence and activity is to be enormously expanded.

The continuous and unusual presence of smallpox in various parts of the State moves your committee to urge upon the Society the importance of a more intelligent supervision of the results of vaccination, the importance of greater care and watchfulness in determining that primary vaccinations are successful, in demanding legislation requiring a general revaccination of all persons at puberty and after puberty, at least once in ten years, and that no child be permitted to attend any public or parochial school unless the same can show the marks of thorough vaccination.

Here your committee is minded to refer to, and to deplore and protest the policy of the present administration of the State in reference to the public health and the State board of health. Your committee has the conviction, that it is not good statesmanship to neglect or to minimise the ordinary means found in operation in all civilized communities for the protection of the public health; and that in the whole history of extravagant and wasteful expenditure, there is nothing more extravagant and wasteful, than a penurious economy in appropriations for the prevention of the preventable diseases; that in the department of public health should ever be found men of the highest ideals and the noblest attainments, for the reason that the problems they encounter are the most intricate, trying and important that ever engaged the mind of man, and that it is of prime importance that the men of this department should be leaders of thought and always in full command of the confidence of the people. How shallow is the intelligence, how thin the veneer of statesmanship, what a bar to real economy and progress is the policy which fixes the annual salary of the State commissioner of health at $3,500 when the commissioner of fisheries and game gets $5,000; the State architect, $7,500, and the three railroad commissioners, $8,000 each? And how humiliating is the easy criticism of the politician, and sometimes law-maker, who asks, what does the State board of health do, and answers himself—Oh, they keep a record of the dead ones, and get well paid for their work! The practical working of the unfortunate schisms in medicine is seen in destroying the public confidence even in medical measures for the protection of the peoples' lives, by the prevention of the preventable diseases, and shows its real colors in the indifference of our legislators to the appeals or advice of this Society upon matters of public health, in the penurious appropriation for the maintenance of our State board of health and in the conspicuously inadequate salary of the State commissioner of health. The members of the legal profession seem to fight each other vehemently in court, but are not known to quarrel among themselves when urging that the salary of the judge be made commensurate with the dignity of his office, and it is so.

The people have ever reserved to themselves the right to say who shall practice the healing art, and what qualifications, if any, such persons shall have. The questions of what preliminary education such persons shall

have, what shall be considered to constitute the science of preventive medicine, a knowledge of which all persons who practice any part of the healing art shall have, are ones upon which the people will probably listen to, and possibly be advised by this Society. The broader questions of how the healing art shall be practiced, what the size of a dose of a particular remedy for a particular disease shall be, whether remedies shall be gathered from nature's inorganic kingdom, or from her organic storehouse, or from both sources at will, whether men shall use water within and without, massage, electricity, hypnotism, or mental suggestion, with or without the added enforcement of religious belief, are those concerning which the people have ever shown themselves unwilling to be advised and intolerant of dictation. Not understanding or not comprehending the spirit of the people in this important direction has in times past placed this Society in a false light upon questions of great popular interest, if not of public importance. Read in the light of history it seems clear that it would have been better for the medical profession, better for the great interests of the public health, which the medical profession must ever guard, if this Society could have refrained from seeming to want to dictate to the people how they should be doctored, could have contented itself with advising, and could have withheld that advice until it was requested.

Your committee is compelled to force these observations upon your attention by the logic of recent events. The people of the State are experimenting with osteopathy and Eddyism, just as a few years ago they were experimenting with homœopathy and eclecticism. There is great danger now, as then, that this Society, wishing to advise from abundant knowledge, will be found to seem to dictate to the people how the people shall conduct their own affairs; that the ever to be lamented blunders of 1857 and 1865 may be repeated in this the beginning of the new century. It would seem that this Society should have learned by sad experience, that the right is not always expedient, that it is wiser to be content to advise, and perchance to guide in medical questions, to be content to memorialise and to protest with becoming dignity, remembering that the weightier matters,—higher medical education, increased medical efficiency and better protection to the public health,—may only be adequately promoted and prospered by a united medical profession inspiring, guiding and leading a sympathetic and appreciative people.

Respectfully submitted.

H. R. Hopkins,
Geo. B. Fowler,
J. H. Pryor,
J. M. Mosher,
M. A. Veeder,
J. L. Heffron,
*Committee.*

ANNIVERSARY ADDRESS

# ON THE VALUE TO THE PHYSICIAN OF MODERN METHODS OF DIAGNOSIS

By HENRY L. ELSNER, M. D.
SYRACUSE

GENTLEMEN: On this occasion I wish once more to express to you my thorough appreciation of the great honor which my election to the Presidency of the Medical Society of the State of New York implied, and to thank you heartily for this proud distinction.

The development of medical science has been so rapid that to those who have been in practice twenty or even fifteen years, who have not kept pace with the advances and the scientific movement, the language of the medicine of to-day is almost unintelligible. Indeed, medicine has been metamorphosed from an art into a science, to the everlasting credit of an unselfish profession, and to the benefit of mankind.

Rational medicine requires for its successful practice a scientific fundament. It is not long since our methods of investigation were crude and faulty; instruments of precision were wanting, and the many refinements of diagnosis which we now possess were either undiscovered or the few in use were to be found only in the larger universities. It gradually became evident, however, that to complete the education of the physician it was necessary to establish the laboratory (that true workshop of the physician), where he might study the conditions which exist in health; learn to appreciate the changes wrought by disease; gather lessons from the thorough study of physiological chemistry, and record many facts concerning the modification of

perverted functions by the application of remedies. Without these object lessons many of the astounding advances of modern medicine could not have been made. By the aid of these, medicine has made greater progress during the past three decades than had previously been made in as many centuries.

The scientist must of necessity be a revolutionist. All things he must prove for himself. Richet has truly said, "By experiment and by science, medicine is compelled to march forward." This is as true to-day as it was in the time of Harvey, and should prompt us to encourage in all fields of medicine, wherever permissible, original painstaking experiment and the conscientious application of positive conclusions to the recognition and treatment of disease. Unalterable and earnest in the belief that modern methods of diagnosis have proven themselves of the greatest advantage to the physician in the study of disease, and with a conviction deeply grounded, much against my will, that only a minority of the medical profession has adopted these refinements, by the use of which medicine in its science becomes more and more exact, I have concluded on this occasion to address you "On the Value to the Physician of Modern Methods of Diagnosis."

The profession, as organized in our Society, has always represented a progressive element in medicine; has demonstrated its willingness to enlarge and enrich its field of usefulness and influence; has striven to disseminate knowledge far beyond the limits of our own State; and it is because of this encouraging past and the promising present, which cements the past and the future, that I bring this subject to your notice, that our influence may be exerted in behalf of methods in diagnosis which rest on a scientific foundation, and which prove, when impartially reviewed, to be of inestimable value to the suffering. We are not to rest content with the uncertain methods of our forefathers, which seemed to them, as they seem to many to-day, to unearth the entire truth, but with Lessing we must proclaim, "Not the bare truth which everybody possesses, or thinks he possesses, but the earnest endeavor which he has made to understand the whole truth—to get at the foundation of it—makes the worth of a man. For it is not through its possession, but rather through the search for the truth, that his powers are enlarged, which alone make for his growth toward perfection. Possession makes him quiet, indolent, proud." Ours is a pro-

fession which can ill afford to be satisfied with possession which makes it innocuous and proud. Ours is the task of blasting in the quarries of the unknown, where are hidden innumerable precious truths awaiting development. Thus may our art "gain the reach and certitude of sway over disease which we all yearn for it to possess."

Sir Michael Foster has recently said, "The phenomena of disease, being phenomena of living beings, present themselves in most, if not in all cases, as problems, as mixed problems of physics, chemistry and biology, to be grappled with by the doctor as they are grappled with by the physicist, the chemist and the biologist." To this quotation I add the words of our own philosopher and pathologist Welsh, recently given to the profession at the Virchow dinner: "General pathology must call to its service not only morbid anatomy, but also experiment and clinical medicine; nor is practical medicine to be founded upon pathological anatomy and general pathology alone, important as they are to the physician in many ways. Clinical medicine, as well as every other department of medicine, must be investigated by itself, deriving, as should every science, all the aid it can from allied sciences."

Our appreciation of clinical diagnosis by means of microscopic and chemical methods is well demonstrated by the hearty welcome with which the original work of von Jaksch, and later the volume of Simon's, both on clinical diagnosis based on newer methods, were received by the progressive internists. We were eager for more exact knowledge—for science to aid us in our art. The statement by Simon that "Diagnosis is now the password in medical science," needs to be realized by many who continue satisfied with the uncertain methods of the past. The value of the application of the knowledge of physiological chemistry to the recognition of disease is splendidly illustrated by the certainty with which many diseases of the stomach and intestines are thereby recognized. Here I may be permitted to quote from a former address: "With the discovery of free hydrochloric acid in the gastric mucus by Prout in 1824, and the demonstration of pepsin by Schwann in 1836, the first data for an ultimate and more thorough understanding of the physiological and chemical functions of the stomach were given. These discoveries, with those of Reaumur and Spallanzani, formed the foundation upon which ultimate gastric pathology was to rest,

and upon which a structure has been erected to which modern medicine points with just pride. "The way to pathology is through physiology," says Ewald, and the more we deal with this subject the firmer is the truth of that statement impressed upon our minds. It is not the study of the peptonizing function alone which claims our attention, but it is the proper understanding of the entire work which is performed in this human laboratory, including a large part of the alimentary canal, and a thorough appreciation of the relations which each function bears to the others, that make a rational anatomical diagnosis and indications for treatment possible and in many cases positive."

When Kussmaul in 1869 first used the stomach pump and tube in the treatment of disease, Liebermeister correctly prophesied that this manœuvre would probably mark an epoch in gastric pathology and therapy. When Leube in 1871 first recommended the stomach tube for purposes of diagnosis, he cleared the way for the ready diagnosis of stomach disease. Without the method evolved from Leube's original innovation, gastric diagnosis would soon fall, and the treatment of stomach disease would once more become as unscientific as of yore.

The diagnostic value of the absence or diminution of free HCl. in the stomach secretion, associated more particularly with pyloric cancer and ultimate dilatation, was first systematically investigated by R. von den Velden, at Kussmaul's clinic in Strassburg. Golding Bird called attention to this fact in 1842, and it seems strange that this information was ignored by the profession for diagnostic purposes during so many years. I found in my investigations of gastric cancer, reported in 1893, in one hundred and twenty tests, free HCl. absent in 92.7 per cent., and present (as a rule feebly), in 7.3 per cent.; and from a larger number of cases since studied, material change in these figures is not justified.

The diagnosis of cancer of the stomach from the absence or presence of free HCl. *alone* ought never to be made, but associated with other symptoms leaning toward malignancy, we may assume with considerable certainty that the demonstration of the presence of HCl. argues against the existence of cancer. The cases, according to Ewald, "in which there is a positive reaction to the carefully applied tests are so rare, that they have very little bearing on the question." Since the introduction of these

chemical tests for the recognition of diseases of the stomach, we have learned much which is of value relative to blood changes in these and other diseases. Thus in some cases of latent or progressive cancer of the stomach, atrophy of the gastric follicles and pernicious anæmia or other diseases associated with cachexia, stomach symptoms and blood changes, the combined results of gastric tests with the blood examinations, *repeatedly made*, give facts which we must possess to clear the horizon and justify positive diagnosis. Henry's observation showing that the reduction of red blood corpuscles in cancer of the stomach does not keep pace with the cachexia, while in pernicious anæmia the cachexia does not keep pace with the reduction of red blood corpuscles, has been corroborated many times and is of great diagnostic value.

For the surgeon the knowledge gained by our new methods in stomach disease is strongly confirmatory. With a growing experience, we are justified in entertaining for the future a well-founded hope of recognizing malignant disease of the stomach early, when as the surgeon's helpmates we shall save or prolong many lives in comparative comfort. By these methods of diagnosis the dietetics and therapeutics of gastro-intestinal diseases have been placed upon a more solid and scientific basis. The satisfaction experienced by the physician in outlining a diet which he knows will positively find a suitable reception and ultimate assimilation, must be sufficient recompense for the time occupied in studying the individual case.

Time will not permit the rehearsal of profitable experiences in this field. The recognition by our positive methods of qualitative and quantitative changes in the secretory function of the stomach has ended the suffering of many chronic invalids. The recognition of hyper-acidity and hyper-secretion has relieved many unfortunate sufferers from uncontrollable pain, waning strength, and wasting muscle, with rebellious stomach symptoms. Scientific diagnosis in these cases, followed by rational treatment, yields brilliant results. No physician can do justice to himself or to his charge who is unable, when the case demands it, to apply the simple methods which without great labor or loss of time make clear to him the working ability of the stomach in its secretory, motor and absorptive parts.

No one who has worked in the broad field of medicine, unless finally biased by narrow and special practice, contends that in

all diseases of the stomach we need the test meal and the knowledge gained by its chemical examination for the recognition of disease. We shall always meet a large number of cases, however, with uncertain symptoms, with strong suspicions of disturbed gastric function, cases with features of malignancy, though without positive physical signs; cases in which the question of the benign or the malignant nature of the underlying process needs prompt recognition, in which we shall be able to add a strong link by the correct interpretation of data gained by the methods founded upon our knowledge of physiological chemistry.

In this connection, I must call your attention to the great value of inflation of the stomach with air, or carbonic acid gas. In office practice we often gain knowledge of the relative size and position of the stomach, its relation to the neighboring organs, of its walls, as well as the resistance of these, by the administration of a Seidlitz powder, each part separately, to allow the escape of gas in the stomach to distend it. More satisfactory, in cases where this manœuvre fails, is the inflation with air through the stomach tube. The failure to inflate the stomach by these means, with associated symptoms of malignancy, the absence of tumor and free HCl. would lead to a suspicion of infiltrating disease of the stomach wall. In some cases adhesions to the surrounding organs have thus been recognized, while in a case of ulcerating cancer it was found that the adherent transverse colon was readily distended with the tube in the stomach, because of communication which existed between these viscera as the result of ulcerative changes.

The distension of the large intestine with air is frequently of great value in the localization of abdominal diseases; particularly useful in the recognition of renal growths in which the distended gut is found anterior to the growth. These methods are too rarely used and will not be discarded when fairly tested.

The precipitation by centrifugal force of cellular elements from the stomach contents with microscopic and bacteriologic examinations will often prove of great therapeutic and diagnostic value.

In connection with the diagnosis of syphilitic diseases, a fact which has been too often overlooked and which is rarely mentioned is the tolerance of the iodides in specific cases of ulcer and gastritis and the ready relief experienced. Under ordinary

circumstances the symptoms of these patients are almost immediately aggravated.

The application of centrifugal force to clinical medicine is of recent date. Steinbeck, of Stockholm, a medical student, first described the use of the centrifuge for the precipitation of sediments from urine, sputum and other pathological fluids. Litten, at the Congress of Internal Medicine in 1891, made a strong argument in favor of its use; von Jaksch described the positive advantage of the combination of the centrifuge and Biedert's method in cases where he was unable to find bacilli after patient search. Freeborn, of New York, in 1891 demonstrated a home-made machine capable of nine hundred and fifty revolutions per minute. Gerster and Sondern followed with contributions on this subject, and in 1894 Elsner and Hawley, after a considerable experience with the instrument, dilated on the clinical value of the centrifuge.

Experience with the centrifuge has proven it to be of inestimable value. It is one of the few aids to diagnosis which has been generally adopted, and to-day there is practically no laboratory or hospital in which it is not found. The time gained by centrifugalizing urine is of great advantage, where an unaltered urine is desired (fermentation not having taken place); the early precipitate shows epithelial casts and other structures before changes in shape, size and contour occur, and these without bacterial contamination. By the use of the centrifuge, insoluble and suspended elements are precipitated. Blood may be precipitated when present in such small proportion that no other method would show it. It is invaluable to the insurance examiner in aiding to discover the underlying condition in cases of so-called transitory, cyclic, or puzzling permanent albuminuria. It is our most reliable aid in detecting early, primary genito-urinary tuberculosis. It precipitates small quantities of albumen with picric acid and makes possible the immediate application of Esbach's test, thus saving twenty-four hours. The bacteriological examination of serous exudates and other pathological fluids is expedited by its use as is also the examination of sputum for tubercle bacilli where they are present in small numbers. The writer found that in twenty-one per cent. of urine analyses the centrifuge yielded results which led to greater accuracy in diagnosis than could have been otherwise obtained.

In doubtful cases of renal calculosis, the method of Kelly,

including the distension of the kidney and its pelvis with water, after his improved manœuvre, gives information which cannot be obtained without exploratory operation. The added evidence furnished by the X-ray examination and the skiagram will often furnish proof which justifies accurate and scientific diagnosis, though the clinical history may be meagre and unsatisfactory. These and similar methods, with painstaking bedside study, may arouse suspicions which must finally lead to positive conclusions.

The birth of a new science, hæmatology, founded upon accurately interpreted data, has added great pleasure and material profit to the study of many conditions, formerly puzzling in their differentiation, and unsatisfactory in their treatment. No diagnostic methods in medicine give more conclusive evidence or offer more uncontrovertible pictures than are revealed by those which we to-day include in our examinations of the blood. When I hold that these methods have not only been profitable, but have given the diagnostician genuine pleasure, I speak without exaggeration.

It is not the object of the evenly balanced physician to replace the knowledge gained at the bedside by laboratory findings, or to limit diagnosis by considering only facts made positive by microscopic examination and staining of the blood, but to *add* the exact knowledge which was unattainable before the advent of hæmatology. Let him who has never relied upon blood examination for assistance in diagnosis, work but a short time in this field, and he will unfold a chapter to which he will revert for information; upon which he will learn to place great reliance as he becomes more and more conversant and expert in technique. Blood examination means much more than would appear on the surface to those who are unacquainted with hæmatological methods. From a narrow conception of the true significance of the anæmias, we have broadened the field until we hold without fear of successful contradiction that the positive diagnosis of the simplest form cannot be made without the aid of data obtainable by blood examination. Clinically, the picture of a grave anæmia, non-malignant, is often identical with that of pernicious anæmia. Pernicious anæmia may, in some of its stages, simulate exactly in subjective symptoms and in many of its objective features, a true leukæmia, while Hodgkin's disease may present symptoms not unlike malignant disease, lymphatic or mixed leukæmia. The missing link in the differential

diagnosis can only be furnished by laboratory examination of the blood. Without the quantitative test for hæmaglobin, we would often fail in our differentiation of the anæmias, while our treatment would continue to be irrational. Differential blood counts and staining methods give data which justify the positive differentiation of the various forms of anæmia, known as leukæmia. Thus we have learned to recognize the pathognomonic lymphocyte of lymphatic leukæmia and the myelocyte of the myelogenous or spleno-myelogenous variety of the disease.

Who shall be able to compute for the profession the gain which has accrued from our ability to diagnose malaria from the presence in the blood of its protozoon? Our ready method of demonstrating the organism of malaria has made positive the nature of many most difficult and troublesome conditions. Add to this the readiness with which after the method of Sittman we recognize bacterial contamination of the blood, and you have included methods by which medicine has become more exact and satisfactory. In many epidemics we meet continued fevers without characteristic symptoms of typhoid, which can only be diagnosticated by the systematic use of the Widal agglutination test. The percentage of failures is relatively small, while the positive information, so much needed in doubtful cases, is often, though not always, obtained. Absence of leucocytosis or a diminution below the normal of leucocytes with fever, with the absence of other objective features, has often justified the diagnosis of typhoid before a positive Widal test was obtainable. The presence of leucocytosis with chills and fever, or with continued fever, with or without local symptoms, has often led to conclusions which have been life-saving in their effect. Sudden and persistent leucocytosis in typhoid fever, and in other conditions not usually associated with polymorphonuclear leucocytic increase, points to complications the nature of which may be surmised with great certainty when the result of the blood examination is considered with the associated subjective and objective symptoms. The revelations of a leucocyte count in a case recently seen where irregular fever and chills followed dysentery, without more than a slight tenderness in the right hypochondrium with slightly enlarged liver, furnished the information which made pus accumulation probable and justified exploration. An abscess of the liver was found.

Puzzling cases in which tuberculous diseases require differ-

entiation are often cleared by a count of leucocytes. This method of differentiation is one which we will often use, and unless we have mixed infection with tuberculosis the absence of leucocytosis may be considered an important factor in diagnosis. Thus in tubercular peritonitis the leucocyte count is not materially increased. Leucocytosis with brain symptoms argues in favor of meningitis, non-tubercular.

Much has been written recently on the condition of the blood in surgical disease, particularly in appendicitis. In connection with this disease, we must not fail to give an existing leucocytosis the prominence which it deserves. To depend upon the results of the blood examination without giving to other symptoms in a suspected case of appendicitis their proper import, would lead to unpardonable error.

The diagnosis of Trichina Spiralis may be and has been corroborated in doubtful cases by the presence of eosinophilia. Eosinophilic increase may become an aid in the recognition of scarlet fever where other data are wanting or meagre. The detection of indican with or without leucocytosis, gives information of value in occasional doubtful intestinal and abdominal diseases.

It has been said that the time occupied in making blood examinations is out of all proportion to the knowledge acquired,—an unjust and untrue charge. To gain exact information is our aim at any expense of time, but fortunately a thorough blood examination can be completed in less than one and one-half hours, while in the majority of cases with our newer methods and better technique, one half that time will suffice to give the information needed. The successful and busy physician ought to be willing to relegate this work to those less occupied; he will always be able to find trained assistants to complete this work for him. The simple and rapid methods of staining malarial and other blood films without fixation after the method of Romanowsky and with the Jenner panoptic stain, reduce materially the time necessary for gaining satisfactory results.

The bacteriological diagnosis of certain diseases has become a matter of routine with the scientific worker. To the bacteriologist we look for the solution of many important problems in the prevention and recognition of disease. The number of lives annually saved by the application of bacteriologic methods to the diagnosis of disease cannot be estimated. When we consider the

advantage of bacteriological examination of the blood, including culture experiments, we are led into a broad field in which the practicing physician cannot do more than accept the knowledge gained from the well-equipped laboratory over which special workers must always preside.

We have not received the encouragement which we deserve from the State in our efforts to prevent and diagnosticate disease. The policy of the State in this direction has been niggardly and short-sighted. Every section of the State should have a well-equipped laboratory where thorough bacteriological work is done to give the aid to the profession which for public safety is often promptly needed, and where many difficult questions can be definitely settled. Thus I have found during the past year, counties in which there were no facilities for making cultures in cases of diphtheria, or for the application of bacteriological methods to the recognition or treatment of disease. Such faulty policy can only end in disaster and useless sacrifice of precious lives. I fear that many in our profession, as well as our legislators, have failed to appreciate what a leading part the microscope and bacteriology play, for an improved diagnosis is but a small portion of the gain to be derived from a scientific study of the causes of disease. "A new direction has been given to treatment."

The enormous advantages of serum diagnosis were well illustrated during the Spanish war, when the fevers prevalent among the American soldiers in Cuba and Porto Rico were claiming so many victims, and the differential diagnosis of typhoid malaria and the dysenteries was of such transcendent importance. The blood of ninety-five per cent. of the typhoids showed a positive serum reaction, the malarias were easily recognized by the characteristic protozoa, while the dysenteries gave no positive blood picture. Cases of typhoid associated with jaundice are mentioned by Cabot in which the diagnosis of yellow fever was eliminated by the immediate typhoid serum reaction. Cabot says, and it is true, of serum diagnosis: "The whole process can easily and safely be carried out by the physician in his office without any laboratory facilities and without half the skill or labor necessary to examine the urinary sediments."

Much has been written during the past few years on the advantage of lumbar puncture in doubtful cases of brain disease, particularly in tuberculous meningitis. Microscopic exam-

ination of the fluid has often been negative. Langer sought to aid diagnosis by incubating the fluid withdrawn, but the patients died, as a rule, before conclusions were reached.

For animal experimentation large quantities of fluid are required, even for intraperitoneal injection, and positive results are too long postponed. It is doubtful whether in case of failure to demonstrate microscopically the presence of tubercle bacilli in the fluid withdrawn, we shall succeed by experiment of any kind in establishing a diagnosis with sufficient rapidity to be of any value to the physician.

It has been found that sugar is usually present in the meningeal fluid in cases of brain tumor, while in tubercular meningitis it is absent, as a rule. It will be preferable to depend on the ophthalmoscope in these cases without the puncture. Lumbar puncture in the hands of the inexperienced or uncleanly is not without its dangers. It is not at all likely that it will ever be adopted by the general profession for diagnostic purposes: indeed, in the majority of cases we are not dependent upon the information which it has been supposed by some to convey.

In occasional cases the diagnosis of malignant disease may be strengthened by the examination of serous effusions and tissue removed after some one of the improved methods. Cancer cells are no longer considered characteristic. Dock has shown that similar cells are found in cancerous, tuberculous and other effusions. The presence of many cells in serous effusions showing mitosis, either typical or atypical in type, is strongly suggestive of malignant growth. Centrifugalized specimens may, however, be examined for evidences of mitosis with negative result. The specific gravity of cancerous effusion is low, tuberculous higher, varying between 1020 and 1028. The presence of a large amount of blood has in several cases of cancerous effusions raised the specific gravity to 1020 or even 1022.

Simon says: "Clinically, it is frequently difficult to distinguish between transudates and exudates, and large ovarian, pancreatic, and hydatid cysts, as well as cystic kidneys, may at times be mistaken for ascites. In such cases a careful chemical and microscopical examination of the fluid in question may be of decided value. Very frequently, moreover, it is possible only in this manner to determine the true nature of the disease, and the importance of freely using the trocar and the arbitrary needle in diagnosis cannot be too strongly advocated."

The use of the Roentgen rays in medicine seems almost uncanny. It is doubtful whether with our present technique we gain many pictures which justify positive conclusions in the study of internal diseases. The greater reliance must still be placed on associated physical signs and subjective symptoms. Certain it is that a correct interpretation of the skiagram requires great experience and the production of the shadow must always be relegated to those whose practices are limited and who have infinite time and patience to give to this work. I know of no field in which greater perseverance and attention to detail are needed.

We have received valuable aid from the X-ray examinations in diseases of the lungs and heart, especially where an accurate knowledge as to size and movement are needed. The diagnosis of intra-thoracic growths and anuerisms has been strengthened by the fluroscope and skiagram, without ignoring associated clinical manifestations. This method of inspection has been of greater advantage to the surgeon than to the physician, but to deny its value in medicine would be absurd and unjust. Changes in the bone, about the joints, and gouty deposits have been satisfactorily demonstrated. Dense foreign bodies in internal organs, such as calculi, are very often demonstrated by the Roentgen rays. Porous calculi have escaped detection in several cases examined by this method. If the negative picture had been depended upon, one case recently seen, in which there were over 500 calculi in the gall bladder, would have remained unoperated. Skiagraphy may be said to be in its infancy, but we are encouraged by the labors of Williams, Leonard, Stubbert and others, to hope for great assistance in the future from the use of the Roentgen rays in medicine. The recent introduction of an apparatus for giving stereoscopic vision by the X-ray is believed by some to add materially to the practical value in medicine and surgery of this method of examination. The usual silhouette effect is replaced by a picture which stands out distinctly, showing the space relations of the object viewed. We are not to be discouraged by the fact that radiographs which seem unsatisfactory to the majority of ordinary observers, are readily interpreted by the expert, for in cases where we must place considerable dependence upon these pictures as giving evidence of pathologic change, we shall give the opinion of the X-ray expert the importance which it deserves, remembering always that we have

received but a link and to strengthen the chain requires the thorough application of other confirmatory methods.

The scientific diagnosis of many diseases of the nervous system has been materially aided by our knowledge of the electrical reactions of the different tissues in health and disease. To those only who have a thorough conception of the newer anatomy and pathology of the nervous system, will electricity give any assistance in diagnosis. Here, as in the localization of central and peripheral nervous lesions, physiological knowledge remains the ground-work upon which diagnosis must be builded.

Bennett has, after patient clinical observation in this field of diagnosis, demonstrated the truth of the statement that, "Like all of our methods of physical diagnosis, electricity must not be depended upon alone as the sole means by which we are to arrive at a just conclusion in investigating the nature of disease. It is only one of the aids we employ, but which, in conjunction with other facts and observations, is a most powerful auxiliary." There are a sufficient number of instances in which electricity offers data for diagnosis which cannot be obtained from any other source, and for this reason the general practitioner, as well as the specialist, must acquaint himself with the method of its application, and must possess the underlying knowledge which makes rational conclusions possible. Though electricity may not be absolutely necessary for the diagnosis of the various paralyses, it remains the means of giving it "a facility and precision which has become indispensable to the neurologist." Electric reactions, associated with a thorough study of the deep and superficial reflexes, lead to the interpretation of phenomena upon which depend localization and diagnosis in many puzzling conditions.

An instrument of precision too little employed by the general practitioners is the ophthalmoscope, for the introduction of which the memory of von Helmholz will always be revered. If the information obtained from its use were limited to the eye, we would not consider its value on this occasion: it gives information regarding the existence and nature of pathologic conditions elsewhere than in the eyes, which is often obtainable in no other way. Gowers, in his classic work on medical ophthalmoscopy, says: "This information depends upon the circumstances that we have under observation: 1.—the termination of an artery and the commencement of a vein, with blood circulat-

ing in each; 2,—the termination of a nerve, which, from its close proximity to the brain, and from other circumstances, undergoes significant changes in various diseases of the brain, and in affections of other parts of the nervous system; 3,—a nervous structure, the retina, and a vascular structure, the choroid, which also suffer in a peculiar way in many general diseases."

We do not contend that the general practitioner must of necessity become an expert in the use of the ophthalmoscope, but we believe that he must depend upon its revelations, if he would early recognize certain diseases of the brain, arterial degeneration and renal complications. Time does not allow on this occasion of an extensive argument in favor of the more frequent use of the ophthalmoscope by the physician; many cases might be taken from the records of those who have learned to use this instrument in general medical practice, which justify the great satisfaction with which its use is continued. We have only to refer to the significance of optic neuritis with brain symptoms, however vague, the presence of chorioidal tuberculosis in advance of other positive symptoms, the presence of albuminuric retinitis in cases of non-albuminuric nephritis, and the presence of retinitis and changed vessels in comparatively young subjects with transitory albuminuria and tube casts, to show the value of the ophthalmoscope to the every-day doctor. Those who for any reason are unable to refer these cases to special workers in this field should educate themselves by post-graduate study in the use of the ophthalmoscope for the recognition of the grosser pathologic changes in the eye.

In the preparation of this address, the fact is appreciated that reference has been made only to a few of the newer methods upon which the profession is to-day leaning as aids in diagnosis. Limited time does not permit the consideration of many of the methods which are of undoubted value as adjuvants in the recognition of disease. What I wish to impress is the importance of working systematically and scientifically, however busy we may be in our practices. "*Qui bene diagnoscit, bene medebitur.*"

It is no secret that the charge has been made that too many patients in this country are often ignorantly and incompetently treated, and our medical schools and system of medical education are held responsible for this state of affairs. We must admit that we too often fail to stimulate the "scientific sense;" men

are not educated to work systematically. Raise as high as you can the requirements for admission into the profession; gain the best timber possible, which will always include a majority, receptive and earnest, and these serious charges will be less frequently made. We shall never be able to impress all with the enormous responsibility under which many almost stagger in medicine.

Many agencies have influenced American medicine. Whether these originated from communion with Louis, Laennec, Trousseau or Charcot in France, whether they were led by the Berlin school, the immortal Schoenlein, Traube, or Virchow, and their followers; were founded upon the methods of the Vienna school, from which radiated the benign influence of Bamberger, Duschek, Skoda, and a score of others, or were the products of our own enlightened masters of medicine—and we have had many—each had a scientific fundament and each vied with the other in unearthing new truths to be applied to the recognition of disease and its treatment.

The clinical medicine of the past may with reason be compared with a rude and hardy plant, now grown, in spite of neglect, to a colossal tree with innumerable branches, richly laden with fruit, its roots reaching far into the fertile soil for nutriment. This soil must be nutured and sustained—else the tree will fade and die. The new must become an integral part of our being; the new of to-day is often enriched by the new of yesterday. True it is that "Stagnation is something more than death." The physician of to-day has countless advantages over his forebears; his training makes him more enlightened; he has been forced to equip himself for his life's work. The advantages offered for the thorough and scientific study of disease were never before equalled in this or any other country.

A generous public, by the free giving of material aid, encourages the solution of scientific problems related to disease and its prevention by scientific methods. In return, it has a right to demand the product of our best, our most conscientious efforts. Are we not also prompted by selfish motives to work scientifically? Our only safeguard against quackery is "Continued recurrence to the scientific basis on which the practice of medicine rests." We must gain exact knowledge in order to derive satisfaction from our practice. Even with increasing knowledge

the layman's demands may in many cases be far beyond our ability to supply.

We can ill afford to encourage iconoclasts in medicine. Fortunate for us that we have no Paracelsus—a badly-balanced genius—a dangerous revolutionist at work to reject all that has been taught because of a pronounced taste for a single science. There will always be extremists against whom the evenly-balanced must array themselves. The application of modern methods in the diagnosis of disease must always remain supplementary to bedside study,—but no one who has taken advantage of laboratory methods will deny that much may be learned by laboratory study, of the greatest scientific and practical importance, without which we would be poor indeed. The practical diagnostician will not be narrowed by the association of laboratory methods with clinical data; he will not become theoretical, but more practical; he will become a more acute and cautious observer because of this training; he will "acquire knowledge at first hand" and make few hurried diagnoses; he will be prompted to do more original work.

There are those who, in spite of the fact that we are encouraged in all educational matters to develop the observant sense, continue to decry all laboratory and scientific methods. The scientist is charged with being a dreamer and impractical. "There are some, indeed, who would tell you that the scientific man is ill fated for anything but science; that he cannot be punctual, business-like, a plain speaker, pious, or, I know not what else." * * * "It would be difficult to find greater nonsense in any of the books or journals on a modern bookstall." "There is nothing that a man may not be at the same time that he is scientific." (Paget.)

Failures in practice are by no means limited to the scientific. This fact requires no extended argument. Did Schoenlein's practical work in Berlin suffer because of his scientific attainments, or because he became the pioneer in Germany in the introduction of physiological methods, the microscope and chemical analysis, in the study of his clinical material? Haller had made the attempt one hundred years before, but the scientific fundament supplied by pathological anatomy was wanting. Hippocrates auscultated, and one hundred years before Laennec, Auenbrugger attempted to introduce percussion as a diagnostic agent. These attempts bore no fruit; pathological anatomy

was needed to make clear the meaning of physical signs. It is by no means to be considered an accident that among the greatest advances in medicine made during the century just closed, the introduction of pathological anatomy and auscultation into the clinic, both were introduced by the same clear mind, Laennec. He is one of the greatest physicians in history. Allbutt has said: "He deserves to stand by the side of Hippocrates, Galen, Harvey and Sydenham. His work was a revelation of the morbid anatomy of the internal organs during the life of the patient."

The physician who is truly successful in practice must depend in a great degree upon the good opinion of his fellow practitioners. Laymen have not the positive means of gauging our ability which those possess who are fitted to judge. Nothing commends itself to the professional mind as does the thorough scientific investigation of individual cases. Certainly there are among those who have no medical education some who judge reasonably of the physician's worth, but the number of these is few. Of the majority, we may say they are the most ignorant who are most positive and loudest in their praise or denunciation, and these are often the most influential.

Herbert Spencer has well said: "Had we time to master all subjects, we need not be particular."

> "Could a man be secure
> That his days would endure
> As of old, for a thousand long years,
> What things might he know!
> What deeds might he do!
> And all without hurry or care."

Bearing in mind our limited time for acquisition and action, the question which is of such transcendent moment is whether the methods recently introduced are of sufficient benefit in the study of disease to claim our attention and time. We must determine in other words, "the relative values of knowledge." If we consider the relative worth of these methods to the clinician from an unbiased standpoint, we must conclude in favor of the adequateness of the advantages. There is certainly a proportion between the required labor and the probable benefit. The young man needs the knowledge and training which the thorough study of disease develops, while those who

have grown old in the treadmill must take advantage of modern methods and ideas to retain their standing in the profession.

Sir James Paget, in his Memoirs recently published, writing on the "Ways into Practice," and the "Various Ways out of Practice," speaks candidly on the conditions which affect success and invite retrogression. Between the lines one can read the thoughts of this clear-minded gentleman physician, and the appreciation by him of the importance to the honest worker of receiving, after a sufficient period of probation, the methods which were included in the armamentarium of his juniors and pupils.

To those who are practicing at a distance from centres where men are devoting themselves to the accurate methods in medicine, a word of warning may not be misplaced at this time. Your influence will not endure if you persist in ignoring methods which have been tried and found useful. You will finally hold only a remnant of your present clientele. In spite of the fact that the public has never been more credulous or more ready to encourage quackery, the services demanded from the physician were never before expected to be of so high an order. His search must always be after the end of science. "The real and legitimate goal of all sciences is the endowment of human life with new inventions and riches." The individual has a right to demand of his physician accurate recording of all facts relating to his condition with a painstaking investigation of every detail which the case offers, by *every method needed for accurate observation and ultimate diagnosis.* Believing that modern methods of diagnosis lead to the trustworthy interpretation of symptoms with a firm belief in the superior ability of those who have adopted these methods, the lay world is fast removing its former prejudices against hospitals, where medicine and surgery are practiced rationally. The consulting rooms of those who are known to employ most thorough methods are filled with all classes of clients. There is a feeling abroad which calls for thoroughness from those charged with the recognition and treatment of disease.

The period has not yet been reached when we can truthfully deny that our art is in advance of scientific direction and explanation. Now as always, we need common sense, as well as knowledge, with ready decision and resourcefulness. This no college or teacher can supply. We must never allow our critical facul-

ties to exceed the practical. It has been truly said that "Practice without scientific re-edification soon degenerates into stereotyped and sterile routine." No amount of extra labor bestowed on the study of disease will prove irksome to him who possesses the true scientific spirit; on the other hand, the consciousness of a duty thoroughly and consistently performed, will prove an ample reward. Out of the clinical laboratory "the new medicine is to come—the medicine which, penetrating into the intimate processes of Nature, learns to turn Nature to her own correction—the clinical laboratory is to be the scene of the study of the origins of disease."

"A life full of Work and Labor is no Burden, but a Boon and Enjoyment." This served as the text of Virchow's original thesis. His life has been sweetened by the conscientious and scientific application of his great powers, and it is this spirit which will continue to inspire the physician.

*The moral force of scientific methods in medicine is the greatest factor in modern medical practice.*

# A STUDY OF THE CONNECTIVE TISSUE OF THE ORBIT BY A NEW METHOD

Merritt H. Cash Prize Essay, 1902

By LUCIEN HOWE, M. D.
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I. Object. 1. The object of this study is to ascertain more exactly the location of connective tissue bands in the orbit, with their relation to strabismus and operations for its correction. It is the universal experience of ophthalmologists, that tenotomy of the recti muscles is one of the simplest and safest of all operations, while it is also one of the most difficult in which to obtain entirely satisfactory results, and that advancement, though more difficult, is still more unsatisfactory. Another well-established fact is, that these results depend largely upon the extent to which the connective tissue, which is attached to the muscle near its insertion and to the adjacent tissues, is divided. Finally, it is certain that there is some confusion of names and statements in regard to that coarser portion of the connective tissue, which has been already seen and described, and we are thus far entirely ignorant of the finer fibers, which sometimes are of decided clinical importance. In other words, our lack of knowledge concerning the connective tissue in the orbit is to a considerable extent the cause of the disappointing results which frequently follow operations on the recti muscles.

2. The fascia and even finer bands are of clinical importance in relation to accumulation of fluid, or the extension of morbid growths within the orbit, or in the protection which they give from injuries or from bacterial invasions from without.

3. They are also of interest with reference to the normal motions of the globe.

4. It is an advance to add even a single new fact to the sum of medical knowledge, without reference to any practical bearing which it may have at the time. For such reasons it seems worth while to call attention to these structures, especially as

they have not been studied before in the manner which will be here described.

II. Earlier Literature. Present Confusion and Lack of Accurate Details. In order to understand the subject before us, it will tend to clearness of statement and economy of time, if we glance at the first description of these parts and note the confusion that has followed as the result of ordinary methods of dissection. Nearly one hundred years ago, M. Tenon, Member of the Institute, completed a quaint little volume of "Memoirs and Observations," which was "published by the widow, Madame Nyon." In this series of articles on different surgical subjects, there is one of "Anatomical Observations on the Eye and the Eye-lid, which was read at the Institute on the twenty-ninth Fructidor, in the year 13." He then described what he called "A New Tunic of the Eye"—and although the account was short and imperfect and has led to much confusion, nevertheless, that communication has made the name of the writer better known among ophthalmic surgeons of to-day than it was probably among all surgeons at that time. Tenon described briefly the sheath of connective tissue which covers the optic nerve and the globe, as now known to every student. He observed that the tunic was pierced by the tendons of the muscles, and mentioned that, near the insertion of the external and internal recti, fibers are given off toward the edges of the orbit and toward the lids. In a word, Tenon was probably the first to dissect out and describe these connective tissue coverings of the nerve and of the globe, with their important extensions, though, of course, he had no conception of their very practical relation to strabismus or to operations for its correction.

It is unnecessary in this paper, even if it were possible, to trace the literature concerning this subject, as its importance was more and more appreciated, though it is well to point out the confusion of statements concerning it. For, when we seek a description of the connective tissue in the orbit, we find it usually under the term "Capsule of Tenon" and it includes, often, portions which Tenon did not mention and apparently did not know. Moreover, whether we read that description as given in any one of the general text-books, or in one of the monographs, more or less complete, we are struck by one fact. This is, that while there is a general agreement in all that pertains to those coarser fascia and bands most readily dissected

FIG. 1

Ocular surface of internal rectus showing connective tissue fibers. (Secondary attachment) between muscle and globe.

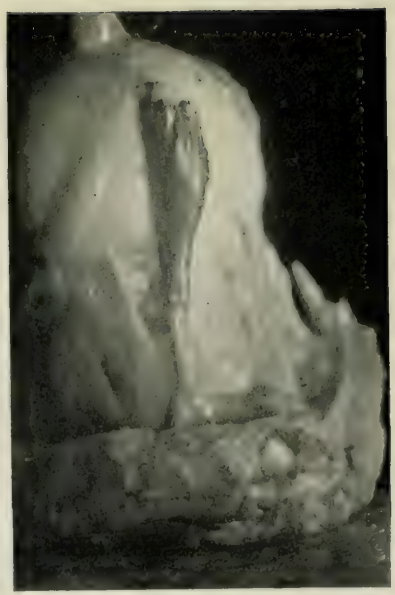

FIG. 2

Outer portion of external rectus. The aponeurosis orbito ocularis is seen by reflected light with a fold of connective tissue passing from the external surface of the muscle to the margin of the orbit.

out, and therefore most easily described, on the other hand, there are omissions or contradictions in regard to the finer fibers—and the confusion seems to grow greater in proportion as the tissue under consideration becomes more delicate and difficult of demonstration.

Schwalbe* says, "We find a most decided difference in the literature concerning the extent of Tenon's space and the relation between Tenon's fascia and other fascia of the globe." Thus Bonnet's description does not accord entirely with that of Budge, and although the latter's arrangement was followed closely by Motais, still these two differ, especially as to the arrangement anteriorly, and neither agrees entirely with what is found in the article by Merkel and Kallius in the portion of Graefe-Saemisch which appeared a few months ago. Moreover, we have thus far no representations by photography of the connective tissue in the orbit, but only drawings and diagrams—some of these, as we shall see, being far from accurate.

Now, it is not strange that there should exist confusion among anatomists when we remember that probably no two of them have made exactly the same dissection of the connective tissue of the orbit. For it must be borne in mind that it is out of the question, with the naked eye, to recognize these fibers with absolute certainty, and even with a dissecting microscope, the difficulty amounts sometimes to an impossibility. But on the other hand, every ophthalmic surgeon knows that these delicate fibers are often of considerable clinical importance, especially those near the insertion of the recti muscle. For example, it is a frequent experience, when making a tenotomy for convergent strabismus, to divide, as we suppose, the entire tendon with all its attachments, but as we remove the speculum, to observe the position of the globe, we find a considerable degree of convergence remaining. Then, replacing the speculum, only one or two minute fibers in addition are divided, or perhaps the hook is simply swept a trifle deeper through the wound, when immediately we see the convergence disappear, and the eye swings into the position desired.

To summarize this portion, therefore, we find, that the term Capsule of Tenon is by no means exact, much confusion existing as to its extent; that this confusion is largely the result of difficulties in recognizing the more delicate fibers by ordinary

* Schwalbe. Archiv fuer mikroskopische Anatomie, 1870, page 1.

dissection, but, that these fibers are of unquestioned clinical importance.

III. More Recent and Better Methods of Studying Connective Tissue. It happens that very recently new methods have been discovered for identifying connective tissue fibers, and a careful search through Nagel's *Jahresbericht* fails to show that any one has yet made use of these to study the fasciæ or bands in the orbit. Nor is this strange, considering how short a time has elapsed since they were discovered, especially the two most useful. The earliest dates back only to 1894. Van Gieson published his method in 1896, Mallory in 1900, and the third, which has been used in this study and which will be described later, is given in this article for the first time.

No account is necessary, of course, of methods already published, but as many trials and repeated failures in this new field have taught the writer some important lessons in technique, it may prove useful to others to refer briefly to them. The special points are:

(*a*) *Concerning the Dissection of the Orbit.* When the walls of the orbit and its contents have been removed, care should be taken to saw down the outer shell of bone as thin as possible. The thicker that is, the longer the specimen must remain in the decalcifying acid, the more brittle the soft parts become, and the more difficult is it to obtain good sections or well-defined stains.

(*b*) *Fixing Solution.* For most methods of staining, the specimen should first be hardened in Zenker's fluid. The results with other solutions often recommended have not been found satisfactory. Nor is it sufficient to leave the specimen, as ordinarily, only a day or so in the Zenker. It is better if hardened three or four times as long, and it is easy to wash out any excess of mercury by means of the Gram's solution of potassium iodide, though, after having been so long in the fixing solution, a more thorough washing, of course, is necessary before the water runs clear.

(*c*) *Decalcification.* The solutions ordinarily used for this purpose are too strong. Thus the twenty per cent. solution of nitric acid, recommended by so high an authority as Birch and Hirschfeld, has been found ruinous to the finer fibers when they were left in it a long time. Even the five per cent. solution of hydrochloric acid, advised by Motais, renders the soft parts brittle when in the alcohol, and a two and a half or three per cent.

solution of the acid has been found to give better results. A still better method is, after fixing in the Zenker, to wash in water and then, wrapping a piece of absorbent cotton carefully around the bone, keep the cotton moist with twenty per cent. hydrochloric acid. In this way the acid acts on the bone alone, with little or no injury to the soft parts. It should be remembered, however, that while decalcification is well enough for the sake of completeness, it is not essential, for after a little experience it is easy to recognize the bands of connective tissue, which at first appear meaningless, even when the fibers stretch off toward the periosteum and end there without any bony attachment.

(*d*) *Stains for Connective Tissue and Recticulum, heretofore described.* These need only be mentioned, although, as before stated, they are all recent discoveries. The list is not long. We have: Unna's orcein stain; Van Gieson's picro-fuchsin stain; Mall's differential method for reticulum; Ribbert's phosphomolybdic-acid hematoxylin; Mallory's phosphomolybdic-acid aniline blue. Of these methods, the second has been found the simplest and most reliable. It does not stain the very finest fibers as well as the Mallory, but all that are of importance, probably, to the clinician.

IV. An Additional Method for Staining Connective Tissue. It was suggested to the writer, by Mr. C. A. Bentz, that connective tissue could be rendered susceptible to the usual stains by first treating it with potassium permanganate and then bleaching with oxalic acid. That was found to be the case, and due acknowledgment is accordingly made. It has been necessary, however, to try solutions of various strengths for different lengths of time in order to formulate even the outline of a method, or arrive at any conclusion as to its value. For the purpose before us, it may be described as follows: After fixing in Zenker, hardening in alcohol, cutting as usual and removing excess of mercury with Gram's solution, if necessary, then: first, wash in water; second, place in one per cent. solution of potassium permanganate one to three minutes; third, wash in two or three changes of running water; fourth, place in one and one-half per cent. solution of oxalic acid four to six minutes, or until the dark brown has faded; fifth, wash as before; sixth, stain in one-fourth of one per cent. aqueous solution of acid fuchsin a minute or more; seventh, wash as before; eighth,

stain in one-third of one per cent. solution of aniline blue, one to three minutes, or until the fibers are thoroughly colored; ninth, wash as before; tenth, alcohol-xylol-balsam. While this method is similar to that of Mallory, it has decided advantages. The phosphomolybdic acid is done away with, and it is unnecessary, therefore, to use only glass rods or platinum needles. The plan is simple, rapid, economical, and the results quite as good or better, for the present purpose, at least, than those obtained by any other method.

VI. The Results of this Study. It is necessary to state at the outset a conclusion drawn simply from an examination of the literature of this subject. It is that the term Capsule of Tenon should not be used in its present general sense, including various extensions of connective tissue, but should be restricted to that portion which covers the optic nerve and the globe itself. With this understanding, it appears partly from foregoing descriptions, and especially from the stains referred to, that the fascia and connective tissue of the orbit can be divided into at least four groups. It will be convenient to consider each of these in order.

(*a*) *Capsule of Tenon.* This, we should understand as the name of the well-known sheath which, commencing at the optic foramen, extends forward, surrounding the optic nerve and covering the globe of the eye as far as the insertion of the recti muscles, or even beyond that point. Externally it is covered by fat, except anteriorly, where the muscles lie directly upon it. By its inner surface, it is connected with the nerve and the globe by means of a delicate net work of fibers. This space has been so carefully studied and described by Schwalbe that but little remains to be said concerning it. He has shown by injection and otherwise, that it is filled with a net work of lymphatics, the clinical importance of which, especially in the possibility of transmitting bacteria from one eye to the other, need only be mentioned to be appreciated. The space that surrounds the optic nerve is much larger than that which exists between the globe and its capsule. This feature is particularly striking, as will be seen by an examination of transverse sections of the nerve, and is a point which apparently has not been mentioned. In the earlier literature there is much confusion as to whether or not the space around the globe is continuous with that around the nerve, but stained sections apparently

confirm the view of Schwalbe, that while the capsule is contracted at the entrance of the nerve to the globe it still remains open there.

The anterior portion of the Capsule of Tenon is of special interest in relation to the operation for strabismus. The important question that arises is, how far anteriorly does the capsule extend. In regard to this point there was much confusion, as already indicated, and this is not surprising when we remember the absence of accurate methods of study. Staining, however, shows beyond question that the capsule proper does extend beyond the line of insertion of the recti.

(*b*) *Connective Tissue Extensions from the Recti.* The recti and the superior oblique, near their origins, have only a very thin covering of connective tissue, but as they come forward their sheaths become thicker and give off fibers in various directions. The stained sections indicate that the actual insertion of the recti is not always by one small tendon along a single line. Although that may occur, we also find fibers of connective tissue which pass off from the muscles, to be inserted into the capsule considerably posterior to the point at which the main tendon is attached. At first these sections caused considerable surprise, but I found that this variation, with others, had already been recognized by Weiss*. As he, like the others, used only ordinary methods of dissection, the number of these fibers found and their extent was probably by no means as striking as by the method here described. We are all familiar, of course, with the fact that some connective tissue fibers do join the muscles to the capsule, but it is not generally appreciated that these are sufficient, in some cases, at least, to constitute a really considerable extension of the attachment. The clinical importance of this arrangement, by which the attachment of a muscle becomes in reality quite extended from before backwards, or has what may be called secondary attachments, is easily seen and needs no elaboration.

In addition to these fibers, connecting the muscles to the capsule, others should be mentioned which extend outward toward the edge of the orbit, most of which form part of the check ligaments. Still other fibers pass from the outer part of the muscles to adjacent soft parts, as from the inner border of the

*1897. Weiss, Leopold. Ueber das Wachstum des menschlichen Auges und ueber die Veranderung der Muskel insertionen am nachsenden Auge. Anatom. Hefte von Merkel und Bonnet. 8 Bd., Heft 2.

superior rectus and upper border of the internal rectus toward the tendon of the superior oblique: in a word, from each of the muscles to adjacent parts.

(*c*) *Aponeurosis or Fascia Orbito-ocularis.* This term was used rather vaguely by some of the earlier writers to include not only the Capsule of Tenon proper, but also those bands of fasciæ which stretch off toward the edge of the orbit. It is much better to restrict that name to portions which it really describes, for such an aponeurosis, or more exactly, such a fascia, has long been known, only its limits have not been as yet well defined. The fibers form a curtain attached to the edges of the orbit, and pierced by the globe, which protrudes, as it were, part way through the curtain, considerably above and a little to the outer side of its center. As the fibers of this fascia pass from the capsule, or from the muscles near the globe, they are attached to the edge of the orbit around the entire circumference. In certain parts, the fibers are so thickened and reinforced by others from adjacent structures that their character is altered, their function becomes especially important, and therefore some of those portions have received special names. The thickened portion toward the median line has been called the internal check ligament, and that on the outer side the external check ligament. But a study of sections in which the connective tissue has been stained indicates that we may also speak with propriety of a superior and inferior check ligament. Let us consider these ligaments in order. They are:

(*a*) *The Internal Check Ligament.* This is a firm band of fascia, formed of connective tissue, which passes from the Capsule of Tenon to be inserted along the line of the crista lachrymalis posterior. This fascia is also strengthened by some fibers which are given off from the internal rectus, by others which curve upward from the inferior oblique and still others from above, near the pully of the superior oblique, where fibers are also blended which come from the superior rectus or even from the levator. The internal check ligament, when viewed in front, is roughly quadrilateral in form. The base, which is ill defined above and below, is attached into the crista lachrymalis posterior for a centimeter or more, and also into the wall of the orbit just posterior to this line. The outer edge of the ligament is attached to the inner surface of the internal rectus and to the adjacent portion of the Capsule of Tenon. Its upper and

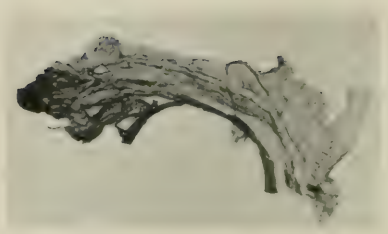

FIG. 5

The vertical section of levator palepbrae and superior rectus showing secondary attachments of the latter.

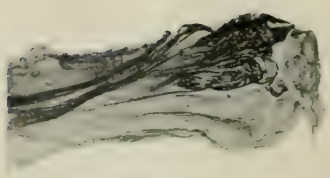

FIG. 6

Vertical section of inferior oblique and inferior rectus showing secondary connective tissue attachments.

lower edges shade off, by imperceptible gradation, into the corresponding parts of the general aponeurosis or fascia orbito-ocularis. The center of the insertion of this internal check ligament is not opposite the center of the cornea, nor on a line with the center of the internal rectus, but considerably below both, as the upper edge of that insertion does not reach, on the crista, much above the fronto-lachrymal suture. Moreover, the anterior surface of this ligament, at its attachment to the crista, is not in direct contact with the posterior wall of the lachrymal canal, but is separated from it by a space of two or three millimeters of loose connective tissue fibers. The clinical importance of this is evident in connection with the introduction of lachrymal probes.

It will be noticed that the form of the ligament as thus described differs somewhat from the "schema," which is figured in the article by Merkle and Kallius in the second edition of Graefe-Saemisch, which has just appeared. When horizontal sections are examined, it will be seen that the fibers of this ligament pass from their bony origin forward, and then curve backward to be attached or to intertwine with others which come from the inner surface of the internal rectus. Thus the ligament may be said to have a thickness from above backward of three or four millimeters near the bone and six or eight, or even greater thickness, near the muscles, if we take into account also the fibers, which are more or less separated from each other. There are several other points connected with the structure, and especially with the action of this ligament, which are of interest in connection with operations for strabismus, but which it would be out of place to consider in the present connection.

(*b*) *External Check Ligaments.* Let us consider next the thickened portion of this fascia orbito-ocularis, which has been called the external check ligament. This is made up of firm bands which connect the outer portion of the Capsule of Tenon with the outer and upper edge of the orbit. Like the ligament of the inner side, its limits are not well defined, as it passes, by imperceptible gradations, into the other portions of the fascia, both above and below. Like the internal ligament, this external one is somewhat quadrilateral in form from above downwards. The outer edge, five or six millimeters from above downwards, is attached to the outer margin of the orbit just below the zygomatic suture. A more exact examination of this shows that

it is formed of fibers of fasciæ derived from different sources; the upper portion comes from the lateral fibers of the levator palpebræ, for it must be remembered that this muscle does not pass directly forward to be inserted into the upper margin of the cartilage, but that fibers sweep outwards, some in fact backwards and downwards over the lachrymal gland, and there, blending with other fibers, form a portion of this external check ligament which we are now considering. This external check ligament is also strengthened by fibers of connective tissue given off from the outer margin of the superior rectus and by fibers from the upper margin of the rectus externus. It is a firm, well-marked band, and is a strong support in holding the eye in its position.

It will be observed that the staining of the connective tissue gives results as regards these portions, especially of the connective tissue, which are quite different from those obtained with ordinary dissections by Motais and other still earlier writers. They do accord, however, more nearly with the very recent descriptions already referred to by Merkel and Kallius.

(*c*) *Inferior Check Ligament.* A third portion of this fascia orbito-ocularis deserves special attention. As the connective tissue fibers join to form a thin ligamentous band, and as it also checks the motion of the globe within certain limits, it may, with propriety, be called the inferior check ligament.

The thickened fibers here do not pass directly outwards toward the margin of the orbit, as is the case on the inner and outer side of the globe. Their general direction is more in the line of the inferior oblique, or, indeed, they curve around with the concavity upward in such a manner as to deserve partially the term given to them by Lockwood. He groups them together under the term ligamentum suspensorium oculi. It is true, their apparent function is partly expressed by this term. But it is also true, that when they are divided below near the globe much greater upward rotation is possible than before.

(*d*) *Superior Check Ligament.* Finally, a fourth portion of this fascia deserves a word. Although much less marked than the other thickened portions it is, in a certain sense, a ligament; it does also prevent excessive downward rotation, and for the sake of completeness, at least, deserves the name of the superior check ligament. It is situated immediately below the upper part of the orbit, and is composed of fibers which come partly from the Capsule of Tenon, from the rectus superior and from

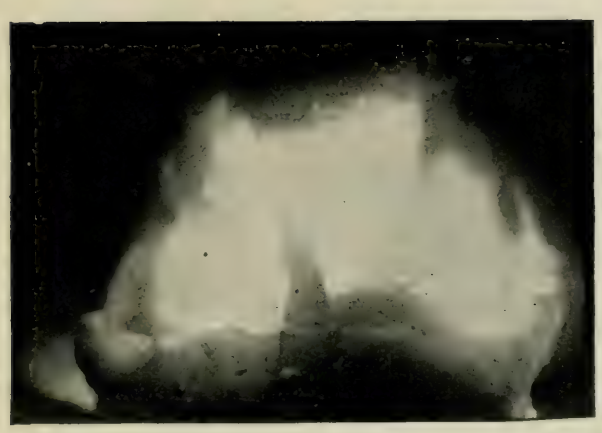

FIG. 3

The connective tissue of the aponeurosis orbito ocularis extended as in figure 2 and viewed by transmitted light. This illumination is produced by placing an electric light behind the connective tissue bands.

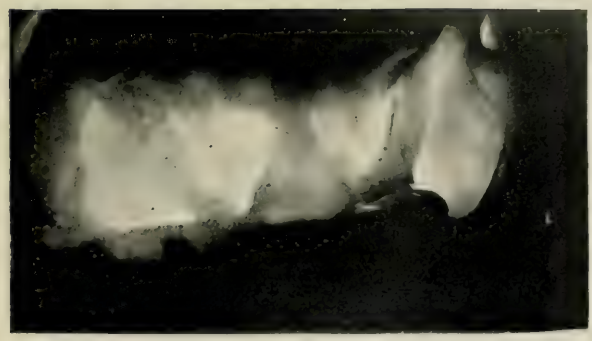

FIG. 4

Connective tissue of the aponeurosis orbito-ocularis. Lighted from behind and viewed in the same manner, as before. Connective tissue fibers are relaxed by allowing the globe to approach nearer the edge of the orbit.

the anterior edge of the tendon and of the superior oblique. It is roughly quadrilateral in shape, being four or five millimeters in length above and below, its center corresponding roughly with the center of the superior rectus.

(*d*) *Other Connective Tissue in the Orbit.* It goes without saying, that the entire orbit is filled with a net work of connective tissue which forms the sustaining structure of the fat, the blood vessels and the nerves. A section in any direction, when stained, shows this net work distinctly. Fibers also pass in an irregular manner from one muscle to another.

An erroneous impression is prevalent in regard to these latter fibers, which it is worth while to refer to. When Motais prepared his monograph, following the description by Budge, he dissected out these fibers deep in the orbit, which pass from one muscle to another, apparently neglecting the others, which ramify through the fat and which indeed are often microscopic. In this way he obtained what Budge had called the "fascia superficialis." The beautifully colored diagram is copied by Maddox, and the description frequently quoted. But here again the staining method is of value. For it shows in transverse sections not simply the fibers which pass from one muscle to the next, but a network throughout the entire orbit quite as well marked as just there.

Conclusions. To such a degree as it is possible to summarize a paper dealing largely with descriptive anatomy, the conclusions may be stated as follows:

1st. Much confusion has existed in regard to the connective tissue of the orbit, this being due to the difficulty in dissecting the finer fibers and to the confusion of terms employed.

2d. By the employment of stains recently discovered, these fibers can be studied with better results than at any time previously.

3d. By the use of potassium permanganate and oxalic acid, we have still another method, and one of the best, for identifying these connective tissue fibers.

4th. With the assistance of these methods, especially the last, an idea is gained of the Capsule of Tenon, of the insertions of the recti, of the cheek ligaments, and of other connective tissue in the orbit, which in every way is instructive and in some details is new.

As the object of this whole study is to ascertain more exactly

the location and relation of the connective tissue fibers in the orbit, it is, of course, desirable also to represent them accurately, and not by schematic drawings or diagrams as had been done formerly. This part of the work has been undertaken by Dr. A. E. Hubbard, to whom acknowledgments should be made for his enthusiasm and patience in struggling with the difficulties of photographing shades of color. Unfortunately, it is practically impossible to obtain recognizable pictures of some portions, especially parts of the check ligaments. The fibers there are so dense as to show only indistinct outlines of grey and black in the photograph, while under the microscope the colored lines are easily followed.

It is probable that in the future, when plates more sensitive to colors can be made, more satisfactory results will be obtained. But, in spite of the difficulties of photographing these special stains, it can be said that the pictures, such as they are, at least are the first which we have of the fascia and connective tissue bands in the orbit.

1805. Tenon. Sur une nouvelle tunique de l'oeil.
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# COMMUNICATIONS

## I. SYMPOSIUM ON DISEASES OF THE PANCREAS

### 1. Physiology of the Pancreas

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In 1643, John George Wirsung, holding the famous chair of anatomy at Padua, reported with much detail his discovery of the duct of the pancreas. He describes its entrance into the duodenum near the biliary duct, and likewise its ramifications in the body of the pancreas, and he notes that this duct, which to-day we call the duct of Wirsung, never contained blood, and hence could not be an artery or vein. On the contrary, he describes it as frequently filled with a colorless fluid, but he had no conception of the function of this gland, which up to that time was classed by Malpighi along with the salivary glands, thyroid and thymus as a gland without ducts and with no particular function. Wharton, the Englishman, and Stenson, the Dane, were to come later and, by their work on the structure of the submaxillary and parotid glands, whose ducts they discovered, paved the way for a consistent theory of secretion. Stenson clearly saw that in the production of saliva, for example, the arterial blood brings matter to the gland, which in some fashion passes it on to the beginning of the duct, and thus renders possible the formation of a specific secretion. He even theorized as to the way in which the nerves going to the gland might act, but he naturally lacked knowledge of the minute structure of glands, and so could not formulate any detailed theory of secretion. While Wirsung had evidently seen pancreatic juice, it remained for De Graaf, a pupil of Sylvius, of Leyden, in 1664, to make a pancreatic fistula, and thus obtain the secretion in some quantity. It is interesting to note how, at this early date, after various unsuccessful attempts, he at last

succeeded in accomplishing his purpose. Using the quill of a wild duck as a cannula, he opened the abdomen of a dog upon which he had previously performed tracheotomy, and after ligating the duodenum below the ducts, as well as below the pylorus, he introduced the quill into the duct of Wirsung and, as he says, obtained in one case from a large dog a full ounce of pancreatic juice in a period of about seven hours. De Graaf, it will be remembered, was a pupil of Sylvius, and was no doubt greatly influenced in his opinions by the teachings of this noted physiologist. However this may be, De Graaf, in his study of pancreatic juice, made this secretion conform in composition with the conception of Sylvius, that chylification was a form of acid fermentation. Although forced to rely mainly upon his sense of taste as a means of chemical analysis, De Graaf states that pancreatic juice is sometimes insipid, sometimes acid or rough, often salt, but generaly acid-salt, and its use in digestion was to effervesce or to ferment with the bile. As De Graaf states, "That effervescence is excited by the mixture of pancreatic juice which abounds in acidity with bile which abounds in volatile and fixed salt, we dare all the more boldly assert, since hitherto we have met with no example of an acid spirit meeting with a lixivious salt without a manifest effervescence resulting, provided impediments are removed."[1] De Graaf, however, clearly recognized that this theory was not quite as well supported as it should be, for he himself had observed that when bile and pancreatic juice were mixed together outside of the body, no effervescence could be detected. Still, he had a theory to support, and in harmony with the methods pursued by some scientists of the present day, facts were ignored and the imagination was given a free rein. So says De Graaf, "No one ought to wonder that we cannot demonstrate an effervescence between bile and pancreatic juice outside the living body, since neither artificial heat nor the natural warmth of the hand can excite such a heat as we know exists in the small intestine, on account of the surroundings of the very warm viscera."[2] But neither Sylvius nor De Graaf was able to explain how this hypothetical effervescence in the intestine promoted digestion. They simply asserted that in some manner it aided or accomplished a proper separation of the useful parts of the food from the non-nutritious or useless material. The only virtue in their work and in their theories—as we look at them to-day—lies in the great

importance they attached to the pancreatic juice as a factor in digestion, for it is to be remembered that their labors antedate by nearly two centuries the classical work of Claude Bernard.

But there is another chapter in this ancient history of the pancreas that must not be passed by. In 1677, Peyer made announcement of his discovery of certain glands located in the intestine, which we still call by his name, and to which he ascribed important functions as the source of a secretion having power in digestion, and he argued that it was the function of this secretion to continue the work commenced higher up in the intestine by the pancreatic juice. It was natural, therefore, under the circumstances, that doubt should arise in the minds of some as to the supreme importance of the pancreas and pancreatic juice in digestion, and in 1682, Brunner, who later filled the chair of medicine at Heidelberg, published the results of some experiments upon the extirpation of the pancreas. He operated upon dogs, but, as he says, was not able to remove quite all of the glands, since the extreme end of the pancreas lay so deep in the body that he could not reach it with the knife. He states that the animal usually recovered from the operation, and then showed no noticeable after-effects. Its health appeared unimpaired. "It ate, drank, ran about as usual, was well nourished, and all its digestive functions were carried on normally. Obviously," says Brunner, "Sylvius and De Graaf were wholly wrong in attributing the importance which they did to the digestive powers of the pancreatic juice. The animals on which I operated secreted no pancreatic juice into the intestine, the duct and nearly the whole gland having been done away with; yet they digested as usual."[3] We may well believe to-day, especially in the light of more recent experiments, that pancreatic digestion is not an absolute necessity in the nutrition of the body, but it is well to remember that in these experiments of Brunner, carried out over two hundred years before v. Mering and Minkowski made their noted observations, we have the forerunner of experiments that in this generation were to determine a relationship between the pancreas and glycosuria, and make clear the existence of an internal secretion of far greater physiological importance than the secretion of pancreatic juice. Further, as another illustration of the early anticipation of modern physiological thought, it is interesting to note that Brunner

made several operations in which he first extirpated the spleen and then later the pancreas, and it is very suggestive to observe that Brunner called attention to the fact, "that the animal, after recovery from the operations, made water very frequently, and that he was very thirsty, drinking largely of water in proportion to the discharge of urine." One may well question whether in addition to the polyuria Brunner observed, glycosuria was not also present.

It is passing strange that such a long time should have elapsed between these early discoveries of the seventeenth century and the epoch when true scientific advance commenced. For two centuries rival theories were bandied about, each more absurd than its predecessor; the iatro-chemical school were contesting the views of the iatro-mathematical school, vitalism was at one time pre-eminent, only to be pushed aside by some theory equally intangible, until finally digestion gained recognition as a chemical process through the labors of Spallanzani (in 1783), and by the work of our own Beaumont in 1830. Not until 1846, however, did Claude Bernard commence his studies on the digestive power of the pancreatic juice, and not until 1856, when Bernard's "Lecons" were published, was there any concise knowledge of the digestive power of this secretion. Bernard, from his own discoveries, was inclined to lay great stress upon the adipolytic or fat-digesting power of the pancreatic fluid. Amylolytic power had been practically established by Bouchardat and Sandras, in 1845, while Corvisart, in 1857, had clearly proved the wonderful proteolytic power of the pancreatic secretion. Since then, Meissner, Kühne, Heidenhain, Langley, Kossel, Pawlow, and a host of other physiologists have, one after the other, brought to light additional facts bearing upon the secretion of the pancreatic juice and upon its manifold digestive power. To-day we understand that the pancreas consists of secretory alveoli, while between these are to be found groups of other cells which clearly have a different function. The cells of the secretory alveoli manufacture and store up within themselves, in the form of granules, the antecedents of the various enzymes or ferments, which give character to the pancreatic fluid.

The secretion of pancreatic juice is normally called forth by some form of stimulation, usually reflex, exerted upon the mucous membrane of the stomach and duodenum. Thus, acids

brought in contact with the duodenal mucous membrane produce at once a secretion of active pancreatic juice. Alkalies, on the other hand, have no such action, and Dolwiski asserts that the acid products of gastric digestion bring about their own neutralization by inducing a flow of alkaline pancreatic juice when they pass into the small intestine. Other substances, notably ether, produce a secretion of pancreatic juice when introduced into the stomach, and no doubt many food products absorbed from either the stomach or intestine cause a reflex secretion of pancreatic fluid.

The secretion of pancreatic juice is undoubtedly controlled by true secretory fibres, although as in the cases of most other secretions the vascularity of the gland exercises a very potent influence. Thus, Pawlow, of St. Petersburg, has pointed out that a brief stoppage of the blood stream causes a cessation of the flow of pancreatic juice, and in anæmic conditions of the gland resulting from reflex nervous influence there is a similar cessation. The gland is unquestionably extremely sensitive to vascular changes, but it is not to be inferred from this that the secretory activity of the pancreas is controlled solely by changes in vascularity. Vigorous secretion is usually accompanied by vascular dilation, and ordinarily direct or reflex vaso-constriction of the pancreas will prevent the action of the true secretory fibers. Thus, when the sympathetic is stimulated, there is usually no effect upon secretion because the vaso-constrictor fibers are stimulated at the same time, but if the sympathetic nerve is cut some days previously so that the constrictor fibers may degenerate, then stimulation of the sympathetic will be followed by a secretion of pancreatic juice. Again, as Pawlow has shown, if the vagus nerve be divided in dogs, the pancreatic nerves being intact, stimulation of the peripheral end of the cut vagus will, under certain conditions, cause a secretion from the pancreas. Further, atropin, which is well known to inhibit secretion by paralyzing true secretory fibers, tends to inhibit pancreatic secretion, while pilocarpin excites secretion from this gland. In other words, both the vagus and sympathetic contain true secretory fibers which control in some measure at least the secretion of pancreatic juice, but these may be counteracted to some degree by the vaso-constrictor fibers of the sympathetic. Lastly, it may be mentioned that some recent investigators, notably Popielski, claim the existence in the vagus of inhibitory fibers,

antagonistic to the secretory fibers, a view which gains some support from the long latent period noticed after stimulation of the vagus, and in the fact that a secretion incited by peripheral stimulation of the vagus can later be checked by repeating the stimulation of the same nerve.

We also understand that the pancreatic juice is a strongly alkaline fluid containing an enzyme which quickly transforms starch into soluble dextrins and sugar, mainly maltose; that it contains a second enzyme having power to break up neutral fats into glycerine and free fatty acids, and lastly, that there is present a proteolytic enzyme which transforms proteids or albuminous foods into proteoses and peptones, and these in turn into a row of simple crystalline compounds, viz., amido-acids, such as leucin, tyrosin, etc., and hexone bases, such as arginin, lysin, histidin, etc. Such then, briefly outlined, is the character of the pancreatic juice, the product of the secretory activity of the cells of the pancreatic gland, but it would be undesirable to dwell longer upon this phase of the physiology of the pancreas, important though it may be, since recent discoveries have placed this gland in a much more prominent position, because of its plain connection with certain processes of nutrition or metabolism, of primary importance to the well-being of the organism. To-day we clearly recognize the pancreas as an organ in which processes of great weight take place; an organ which clearly manufactures an internal secretion of supreme importance, or in some manner exercises a potent influence upon nutrition.

In a noteworthy paper, published in 1890, v. Mering and Minkowski[4] called attention to the fact that complete extirpation of the pancreas in dogs was followed by diabetes. The excretion of sugar commences in 4-6 hours after the operation, and at the end of 24-48 hours reaches a high figure, as much even as 5-11 per cent. Even after seven days' fasting, the sugar does not disappear from the urine. Naturally, when the dog is well fed, as on meat and bread, the amount of sugar excreted is still greater. Thus, one dog of sixteen pounds body-weight secreted daily on such a diet 70-80 grams of sugar for a long period. The sugar so secreted had all the reactions of dextrose. It is also to be noted that after total extirpation of the pancreas, there is an abnormal appetite and great thirst. This is accompanied by marked polyuria, a dog of twenty pounds body-weight excreting

1,700 cubic centimeters of urine in twenty-four hours. In spite of the increased appetite and nourishing food, the animal rapidly grows emaciated, loses strength, and in three weeks after the operation the muscles are usually so weakened that the animal cannot walk. Further, it is to be noted that sooner or later, in addition to the sugar, acetone, aceto-acetic acid and oxybutyric acid are excreted, viz., substances which are frequently found in the urine in severe cases of diabetes mellitus. The diabetes continues up to the death of the animal, which may occur within a week, while practically none of the dogs operated on live longer than four weeks. On post-mortem examination, quite noticeable in nearly all cases is the fatty condition of the liver, the fresh organ frequently showing 30-40 per cent. of fat. Equally noteworthy is the lack of these symptoms when the pancreas is only partially extirpated. Under such conditions sugar does not appear in the urine, even though the larger part of the pancreas is removed.

It is evident that the appearance of diabetes in these cases is dependent directly upon the disappearance of the pancreas. Interference with the ordinary functional activity of the pancreas does not bring about diabetes. Complete occlusion of the duct of Wirsung as by injection of paraffin into the ducts, thereby abolishing the passage of any pancreatic juice into the intestine even when accompanied by almost complete atrophy of the gland, does not ordinarily cause diabetes. Plainly, extirpation of the pancreas leads to a change in some of the processes of metabolism in the body. As v. Mering and Minkowski suggest, two possibilities present themselves: either the pancreas normally has the power of removing or destroying some ferment or toxic substance, the retention of which in the organism causes an excretion of sugar, or it is normally a function of the pancreas to regulate the consumption of sugar in the body. In any event, we have here a new function of the pancreas, which is well worthy of closer study.

As one scrutinizes the various results obtained by many investigators in this field during the past few years, it seems probable that in the pancreas there must be located certain specialized cells which manufacture an internal secretion; something which exercises a controlling influence upon certain lines of metabolism in the body. When this internal secretion is wanting, one of the balance wheels is gone, and there results a disturbance and dis-

tortion of the nutritional rhythm. For it must be remembered that in dogs, with the pancreas completely extirpated and with a complete exclusion of carbohydrate food from the diet, the excretion of sugar still goes on, and furthermore bears a certain distinct ratio to the nitrogen excreted through the urine.[5] In other words, under the above conditions, the amount of sugar excreted bears a direct ratio to the amount of proteid or albuminous matter decomposed in the body. The ratio of dextrose to nitrogen in the urine is approximately as 3 :1, and it is evident from many experiments that after complete extirpation of the pancreas practically all of the sugar that results from the breaking down of proteid is excreted through the urine. The body is not able to utilize any of it. This inability of the body to utilize sugar, under the above conditions, applies equally to sugar that may be introduced with the food. Let me illustrate this statement by citing an experiment reported by Minkowski.[6] A dog weighing about twenty-eight pounds, with pancreas extirpated and on a meat diet, excreted through the urine on the seventh and eighth days after the operation fifty-three grams and fifty-eight grams of sugar respectively. On the following day seventy-five grams of dextrose were given with the food, when the excretion of sugar through the urine rose at once to 144 grams for the day. Two days after this, on the meat diet alone, the sugar excreted by the urine fell to practically the original amount, viz., fifty-four grams.

Especially interesting are the experiments recorded by various workers on the transplanting of pieces of pancreas under the skin. When such pieces are well grafted, then the entire pancreas of the animal can be removed from the abdominal cavity without the appearance of diabetes. When, however, the engrafted pieces of pancreas are cut away, glycosuria speedily shows itself. So here again we find evidence that no direct connection exists between the ordinary secretory function of the pancreas and that other function which has to do with the utilization of sugar by the body.

If we examine more closely the experimental data, which have been gradually accumulating during the past six or eight years, we find additional light thrown upon the problem, although it does not afford a concise explanation of the cause of pancreatic diabetes. In the first place, we are certainly justified in saying that the glycosuria resulting from extirpation of the pancreas is not

wholly due to increased transformation of the glycogen stored up in the liver and other tissues. Directly after the operation, the sugar which appears in the urine undoubtedly comes from conversion of the hepatic glycogen, but, as already stated, the excretion of sugar continues at a high rate long after the glycogen of the body has entirely disappeared. Further, the ratio of sugar to nitrogen in the urine is such as to point conclusively to the origin of the sugar in proteid. In this respect, therefore, pancreatic diabetes resembles phloridzin diabetes. It differs from the latter, however, in that when the pancreas is completely removed the sugar of the blood is greatly increased, followed by the appearance of sugar in the urine. In phloridzin diabetes, on the contrary, there is no noticeable increase of sugar in the blood, although the urine may contain large quantities of sugar. When the floor of the fourth ventricle is punctured, temporary glycosuria results, and in this case there is a marked increase in the sugar of the blood, thus showing an analogy to pancreatic diabetes. Probably in both puncture diabetes and pancreatic diabetes this initial rise of sugar in the blood is connected with increased transformation of hepatic glycogen, while later on the sugar in pancreatic diabetes comes from the breaking down of proteid. It has been claimed by some physiologists, that under normal conditions the pancreas exerts its influence upon carbohydrate metabolism by aiding in some manner the oxidation of sugar in the tissues of the body, or else by influencing the conversion of the sugar brought by the portal blood into the glycogen of the liver. While one, or perhaps both, of these views may be correct, it is manifest that complete loss of the pancreas leads to much more than a mere disturbance of the relationship between sugar and glycogen formation. Some other explanation must be offered to account for the steady breaking down of the tissue proteids after removal of the pancreas. Moreover, the view that the glycosuria is due to the absence from the blood of the glycolytic ferment normally present there is equally untenable, since, as Minkowski has shown, removal of the pancreas does not change in any degree the glycolytic power of the blood. Again, it has been found that, so far as can be observed, the blood of an animal from which the pancreas has been removed shows no accumulation of toxic substances; in any event, such blood has no power of rendering another animal diabetic. This fact, of course, stands opposed to the theory that it is normally

the function of the pancreas to remove from the blood toxic substances formed in the body, and that the cause of the diabetes resulting when the pancreas is removed is due to an accumulation of such toxic bodies. Another fact of importance just here is, that feeding raw pancreas does not check or prevent the usual symptoms attendant upon complete extirpation of the gland. The case is evidently quite different from what occurs in thyroidectomy, where feeding of thyroid is effective in counteracting the removal of thyroid glands. It is plain, however, that there is something belonging to the pancreatic glands which is instrumental, directly or indirectly, in controlling the formation or utilization of sugar in the body.

To a physiological chemist, the autointoxication theory of pancreatic diabetes seems especially plausible, and although the facts to uphold such a theory are not very numerous, and those presented lack confirmation, yet the theory is perhaps worthy of consideration. In this connection it is to be remembered that Galio[7] some years ago claimed that excision of the pancreas was not followed by diabetes if the thoracic duct was ligated, and further that ligature of the thoracic duct checked the glycosuria produced by extirpation of the pancreas. Lepine[8] and Biedl[9], on the other hand, claim that ligature of the thoracic duct tends to increase, instead of checking, the glycosuria caused by excision of the pancreas, and Biedl further states that a pre-existing glycosuria can be inhibited by the injection of thoracic lymph. With this utter lack of harmony, the truth seems beyond reach, but now comes Tuckett[10] with the hypothesis that the pancreas has an internal secretion which enters the circulation constantly, via the thoracic lymph; and also that a toxic substance capable of causing glycosuria, if not neutralized by the former, is absorbed from the intestine during digestion, via the lymph stream. The hypothesis further supposes that the thoracic lymph contains a large quantity of the aforesaid toxin during digestion, but none at other times, whereas only a small quantity of the internal secretion from the pancreas is ever present in the thoracic lymph, although the blood always contains a relatively large quantity, as it tends to accumulate there continuously. Tuckett rests his theory upon the following observations: he finds that if the thoracic lymph from a fasting dog is injected into the portal circulation of a cat, no hyperglycæmia or glycosuria results; but that if lymph

from a digesting dog is injected into the portal circulation a hyperglycæmia of a degree varying from 0.3 per cent. to 0.9 per cent. is produced, and a glycosuria of a degree varying from 1 per cent. to 9 per cent. He also reports that the injection of thoracic lymph from a digesting cat into its own splenic vein results in marked glycosuria, due, as he thinks, to a large dose of the hypothetical toxin acting on the liver at one time, before it can be neutralized by the internal secretion from the pancreas. Gley[11], it will be remembered, has found that glycosuria results after ligating the veins of the pancreas, and Tuckett finds that the mere injection of a few bubbles of air into the splenic vein is followed by pronounced glycosuria, the air accumulating chiefly in the splenic and superior pancreatico-duodenal veins. This glycosuria, he thinks, is really due to the same cause as that produced by Gley, viz., by an impeding of the venous return through the pancreas, thus checking the outflow of the internal secretion from the gland, and thereby allowing the toxin to accumulate in the blood. This ingenious theory, which seems to have some foundation in fact, we cannot follow further, but it is well worthy of more careful study.

As has already been stated, there are to be found in the pancreas groups of cells, known as the islands of Langerhans, which are not connected with the lumen of the ducts of the gland, and which are evidently not concerned with the manufacture of pancreatic juice. These cells are surrounded by or intermingled with a rich network of capillaries, and from their structure and their environment the view has been advanced that these cells, or groups of cells, furnish an internal secretion which is passed on into the blood and lymph. There is certainly a close resemblance in architecture between the islands of Langerhans and that of other ductless structures, such as the thyroid, suprarenal and similar glands, and various writers, as Shäfer[12], Diamare[13] and Laquesse[14], have put forward the view that the influence exerted by the pancreas on carbohydrate metabolism is to be traced to these groups of cells. Ssobolew[15] has indeed pointed out that the cells composing the islands of Langerhans undergo a change of structure—becoming more granular—when animals are fed on a carbohydrate diet, and he has also observed that in dogs, on ligating the duct of Wirsung, the islands of Langerhans are not involved in the sclerotic process that ensues. Opie[16] has likewise observed in human cases where

obstruction of the duct has occurred, that the islands are resistant to the inflammation which usually follows. All this, of course, is construed as indicating the physiological individuality of the cells composing the islands, and as, perhaps, suggesting that they alone have to do with carbohydrate metabolism. Opie[17], who has made a careful study of the histological structure of the pancreas in man and in animals, states distinctly that the cells composing the islands are independent of the secreting apparatus of the pancreas, and are in intimate relation with the vascular system. Later[18], he is led to the conclusion from the observation and examination of cases in the Johns Hopkins Hospital and Pathological Laboratory, that destruction of the islands of Langerhans is associated with diabetes mellitus. This statement may, perhaps, be amplified by the assertion that whenever there is a lesion of the pancreas involving a destruction of the islands of Langerhans, then diabetes results. Finally, I may call attention to the work of Flexner on "Experimental Pancreatitis."[19] This investigator finds "that pancreatitis follows upon a variety of insults to the pancreas, and is capable of developing with great rapidity. The introduction of such a foreign body as artificial gastric juice into the pancreas, gives rise to degeneration, hemorrhage and emigration of leucocytes, within the brief space of one to two hours." Also, "fat necroses attend all forms of pancreatitis and are more numerous and widespread the more acutely the pancreatic lesions develop." Flexner likewise calls attention to the rapidity with which glycosuria develops after these insults to the pancreas. Thus, in one experiment where defibrinated blood (twenty cubic centimeters) was injected into the duct of Wirsung of a dog, the urine showed sugar in thirty minutes. In my own laboratory, the injection of defibrinated blood from a dog into the duct of Wirsung of the same animal has been followed by the appearance of sugar in the urine within fifteen minutes from the beginning of the injection, the urine in this case being collected through cannulæ previously introduced into the ureters.

There are undoubtedly many ways in which glycosuria results, many causes leading to the temporary and continued appearance of sugar in the urine. The injection into the blood of $\beta$-nucleoproteid, as Ivar Bang[20] has recently shown, leads to the excretion of sugar in the urine, and as the proteid likewise causes a marked though temporary fall of blood-pressure, the cause of the glyco-

suria may, perhaps, be sought for in some localized change of vascularity. Finally, in this connection, it is worthy of note that Blum[21] has just recorded the presence in the suprarenals of a substance which, on introduction into the circulation, produces glycosuria; a substance which is effective not only when the liver of the animal is stored with glycogen, but also when the hepatic cells are free from carbohydrate, as in hunger.

In conclusion, I may add that while the pancreas has this marked influence upon the metabolism of carbohydrate matter, and while disturbance of the gland, or any insult offered to it, may result in temporary or permanent glycosuria, there are indications that some forms of so-called pancreatic diabetes are to be explained, not through a simple disturbance of the pancreas, but rather as the result of a physiological disturbance of the interrelationship of several allied glands or structures.

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## II. SYMPOSIUM ON DISEASES OF THE PANCREAS

### 2. Some Aspects of the Pathology of the Pancreas from the Standpoint of Recent Investigation

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It is proposed in this review to take up from the standpoint of the more recent work: (1) the relation of lesions of the pancreas to diabetes; (2) the conclusions to be drawn from recent studies of acute hemorrhagic and suppurative pancreatitis as regards the etiology of these conditions and their relation to gall stone disease, chronic interstitial pancreatitis and fat necrosis.

Our knowledge of the results of disease in an organ is necessarily dependent on our knowledge of the intimate structure and function of that organ. In the consideration of diabetes particularly, it is necessary to remember that the pancreas is a much more complicated structure than the salivary glands which it resembles. The well-known researches of Langerhans showed that the pancreatic tissue contains two distinct classes of parenchymatous structure, the ordinary gland acini which secrete the digestive juices of the organ and empty into the pancreatic ducts, and the so-called islands of Langerhans, which differ in appearance and structure from the ordinary gland acini. Ssobolew, Opie and others have shown that though we have every reason to believe that the islands of Langerhans have the same origin as the ordinary gland tissue, during extra-uterine life they have no connection with the secreting portion of the gland. Opie shows that they have no connection with the excretory ducts of the organ, and that their cells are in intimate relation with the blood supply, each island being furnished with a vascular arrangement somewhat similar to that of a kidney glomerulus. Without going deeply into the subject of the relation of the pancreas to metabolism, we would simply remark that the relation of the organ to carbohydrate digestion suggests that it possesses an internal secretion. Schafer and Diamase first suggested that it is the islands of Langerhans which provide this secretion, a view which is strongly upheld by Ssobolew and Opie.

The modern conceptions of the relation of the pancreas to diabetes date from the classical experimental work of v. Mering and Minkowski. The observations of these workers, since abundantly

confirmed, showed that in dogs the total extirpation of the pancreas regularly gave rise to a disease resembling in every way diabetes mellitus as seen in the human subject. Some writers, as Reale and de Renzi, could not confirm the statement that these symptoms followed in all cases, but practically all competent observers concede their occurrence in the great majority of dogs from whom the pancreas has been removed. Experimental work by various authors has likewise shown that partial extirpation is followed by glycosuria or a mild form of diabetes, an indication that in man also mild grades of diabetes may be due to pancreatic disease. When from one-fourth to one-fifth of the gland is left no glycosuria ensues. That the experimental diabetes following total extirpation of the pancreas is not due to the injury to neighboring nervous structures is shown by the fact that its development can be hindered by the transplantation of pancreatic tissue beneath the skin of the abdominal wall. Inasmuch as in these cases the normal secretion of the pancreas is not discharged into the digestive tract, this also shows that diabetes is not due to a lack of the pancreatic juice, and renders probable the supposition that besides the pancreatic juice the pancreas furnishes an internal secretion.

Satisfactory as are these experimental data, many puzzling problems confront us in the study of the pancreas in human beings who have come to autopsy after death from diabetes. Leaving aside those cases which are evidently due to lesions in the medulla, we find that the study of the pancreas in the remaining cases shows two groups of cases which are difficult of explanation. On the one hand we have a good many cases of diabetes without perceptible pancreatic lesion, and on the other, cases of complete destruction of the pancreas without diabetes. Of eighty-eight cases of diabetes collected by Hansemann, Bloch and Oser, twenty-eight showed no demonstrable pancreatic lesion. These same writers collected 139 cases of extensive pancreatic disease without diabetes.

The recent work of Ssobolew, Wright and Joslin, and particularly of Opie, throws a good deal of light on the apparent contradictions which these figures suggest. It is undeniable that in their microscopic studies of the pancreas the earlier writers paid little attention to the condition of the islands of Langerhans. If, as is now supposed, these structures play an important part with regard to the internal secretion of the pancreas, it becomes

at once apparent that their condition is of extreme importance. The work of Opie, and of Wright and Joslin has, in fact, shown that in a certain proportion of cases of diabetes the islands of Langerhans are extensively changed, whilst the great mass of the gland is to all intents and purposes normal. I have myself recently studied a pancreas from a case of diabetes kindly sent me by Dr. Libman, of New York, in which practically the only change found in the organ was the hyaline degeneration of the islands of Langerhans described originally by Opie. Is it not fair to presume that in a certain proportion of the cases described by the older writers as without pancreatic lesion these changes were present? The experience of Wright and Joslin, who found such changes twice in nine cases, would indicate, however, that all such observations cannot be explained in this way; the recent work of Schmidt would also indicate this.

The work of Opie on interstitial pancreatitis also explains why in this class of cases very extensive destruction of glandular tissue may occur without diabetes. He classifies interstitial pancreatitis into an interlobular and an interacinar form. In the interlobular, even where the disease has involved the greater portion of the origin, the islands of Langerhans are not involved. In the interacinar form they are gradually encroached upon and destroyed by the new-formed connective tissue, but even here it is only late in the disease that they become extensively involved.

Some of the cases in which to the naked eye there is apparently complete destruction of the pancreas by a neoplasm and yet no diabetes, have been shown under the microscope by Hansemann particularly, to still contain areas of pancreatic tissue, but whether in such cases the islands of Langerhans are especially spared yet remains to be shown. In other instances where the complete replacement of pancreatic tissue by new growth is demonstrated, both macroscopically and microscopically, and yet diabetes does not occur, explanation is more difficult. Hansemann has advanced the idea that the tumor cells, being direct descendants of the pancreatic cells, inherit from them the power of elaborating an internal secretion. Oser does not consider this theory convincing, but after all it does not seem so far-fetched, inasmuch as we are already acquainted with instances of tumor cells elaborating secretions of the character of those supplied by the organs from which they sprang. Niedrich, Bock and Thoma have all described metastatic adenomata of the liver in which

a substance resembling bile was secreted by the tumor cells. In Bock's case this substance was chemically examined and found to contain large quantities of biliverdin. It would be interesting to observe in pancreatic tumors whether any type can be differentiated, which has the appearance of originating from the cells of the islands of Langerhans, rather than from the glandular structure or the epithelium of the ducts. It would seem possible that the question of the production of an internal secretion by the cells of pancreatic tumors could be cleared up by the physiological chemist. It seems evident that the study of the Islands of Langerhans in diseases of the pancreas, and diabetes particularly, is yet in its infancy, or at least its childhood, and it is reasonable to hope that further study will render still clearer this hitherto obscure field.

The subject of the relation of the various forms of pancreatitis to one another, and to various etiological factors, has, until recently, been more or less obscure, and has given rise to numerous hypotheses. Leaving aside metastatic suppurative pancreatitis, which is obviously the result of a general septico-pyæmic condition, the various authors writing on primary pancreatitis have had before them for elucidation the following problems:

The relation of pancreatitis to bacterial action and to chemical irritants; the relation of pancreatitis to gall stone disease; the relation of hemorrhagic pancreatitis to suppurative and necrotic pancreatitis; the relation of all forms of acute pancreatitis to chronic pancreatitis and to fat necrosis.

It is obvious that in order to trace the mechanism of the various processes under consideration, step by step, the experimental method had to be resorted to. Injection of various bacteria, either into the duct of Wirsung or into the parenchyma of the pancreas, has resulted in many instances in pancreatitis, rarely hemorrhagic, generally suppurative or of a chronic inflammatory character. Various micro-organisms have produced these effects, the most important being the diphtheria bacillus (Hlava; Flexner), the colon bacillus (Hlava), and the bacillus pyocyaneus (Flexner). These experiments merely indicate the possibility that in some human cases an ascending infection by means of the pancreatic ducts may account for certain forms of pancreatitis.

The production of pancreatitis by means of chemical irritants dates back to the time of Claude Bernard, who produced experi-

mental suppurative pancreatitis by the injection of quicksilver into the ducts. Since his time various chemicals of an irritant nature have been injected by various observers. Korte used turpentine, Carnot chloride of zinc, and Katz and Winkler sulphuric acid. This aspect of the subject was mostly thoroughly worked out by Flexner, who used a large variety of irritating chemicals, some acids, some alkalies, and still others intensely irritating substances, such as formalin. The results of these various experiments may be briefly summed up by stating that all forms of pancreatitis were produced by the action of one or the other of the chemicals used.

Regarding the relation of chemical irritants to human pancreatitis, a step in the right direction was taken by Hlava when he suggested that in individuals with a hyperacid gastric juice this might be carried up the pancreatic ducts by anti-peristaltic movements and set up pancreatitis. He, as well as Flexner and Carnot, showed that artificial gastric juice injected into the ducts produced well-marked pancreatitis. In spite of the attractiveness of Hlava's theory, the chances that such a mechanism can occur in human beings seem extremely slight. Nevertheless, the principle that pancreatitis in human beings can be produced by the introduction into the pancreatic ducts of chemical substances normally secreted by the body cells has recently been placed upon a firm basis by Opie.

Opie's observations were based upon a patient with gall stones, in whom a hemorrhagic pancreatitis developed. At autopsy it was found that a small stone lodged in the ampulla of Vater had blocked the orifice of that portion of the duct common to the bile and pancreatic juice, but had not shut off the lower end of the common bile duct or of the pancreatic duct. As a result of this the bile and pancreatic ducts formed a continuous passage, the latter duct showing evidences that bile had been present in it in the form of bile staining, a result which, as Opie has pointed out, might be expected on account of the fact that the bile is under greater pressure than the pancreatic juice. As a result of this observation, as well as of the knowledge of the quite frequent association between gall stones and pancreatitis, Opie conceived the idea that bile is capable of setting up a hemorrhagic pancreatitis. A study of the literature of the pathology of hemorrhagic pancreatitis showed that the majority of the recently reported cases showed gall stones, and the anatomical relations of the two ducts

are known to be such that a small stone in the ampulla could, in a certain percentage of cases, block the external orifice in the papilla without obstructing the intestinal end of either duct. Opie's suggestion that bile could set up hemorrhagic pancreatitis was proved experimentally by himself, and has since been confirmed by Flexner.

The great point of dispute regarding the relation of hemorrhagic lesions of the pancreas to inflammatory lesions has been with regard to the priority of the two processes. Until the recent work of Flexner and Pearce, the question as to whether the hemorrhage or the inflammatory processes occurred first has been in doubt. The experiments of these authors show without doubt that hemorrhagic, degenerative and inflammatory lesions are all correlated; the several phenomena may all occur at the same time, and that only a few hours after the action of the irritant. The experiments further show that the presence of blood alone in the pancreatic tissue is incapable of setting up inflammatory reaction.

The relation of these various forms of acute pancreatitis to chronic interstitial pancreatitis can be summed up in a few sentences. Both experimental and post-mortem observations seem to show that when animals or individuals recover from the direct effects of the inflammation produced by the various irritants discussed, the connective tissue of the pancreas proliferates, new formed connective tissue is produced and a chronic induration of the organ results. There seems no doubt that in many cases of cholelithiasis a quantity of bile insufficient to cause extensive lesions frequently escapes into the pancreas, and that the well-known induration of the head of the pancreas, which has been so frequently observed by surgeons in gall stone operations, is the result. In one case at least Mayo Robson has demonstrated this on the post-mortem table.

There remains for our consideration the subject of fat necrosis and its relation to these various processes. The more prominent of the older theories regarding the formation of this form of cell death assumed the lesion as due either to the action of bacterial products or to that of trypsin. The relation of bacteria to fat necrosis has been most carefully studied within the last year by Marx. He concludes that the evidence against the production of fat necrosis by bacteria is very strong. The presence of micro-organisms in fat necrosis is inconstant, and those gen-

erally found are organisms known to occur in the tissues post-mortem. Furthermore, attempts to produce fat necrosis experimentally, by means of bacteria or their products, have been almost uniformly unsuccessful. The results of experimental work with trypsin have likewise been many of them negative. It can now safely be said that the demonstration that the action of steapsin, the fat splitting ferment of the pancreas, is the true cause of fat necrosis, is convincing. The presence of this ferment in the lesions of fat necrosis was first demonstrated by Flexner, and his observations have since been confirmed by Opie and others.

The histology of those lesions has also been carefully worked out in this country by Williams, Flexner and Opie. The lesion consists in a splitting up of the fat into glycerine and fatty acids, the former being absorbed, the latter entering into combination with lime salts to form a soap. Surrounding the area of necrosis is found a zone of inflammatory reaction of the tissues. Whilst these researches do not absolutely reveal the mechanism of the distribution of the steapsin, which may act on fat so distant even from the pancreas as the pericardial fat, they simplify greatly the relationship between disease of the pancreas and fat necrosis in that they show that any pancreatic lesion which allows of the escape of the fat splitting ferment may give rise to fat necrosis.

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# III. SYMPOSIUM ON DISEASES OF THE PANCREAS

## 3. The Diagnosis of Pancreatic Disease

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It is not wholly encouraging to reflect upon the slight extent of our diagnostic abilities with regard to disease of the pancreas, to realize how limited are our resources for the detection of other than the most advanced and fatal stages of pathological change in what is, perhaps, the most important of our digestive organs. And yet the reasons for this condition are plain. Changes in the position, size, motility and secretory ability of the stomach are readily appreciable by simple methods of physical examination. In like manner many affections of the liver are easily recognizable. Any interference with its circulation produces demonstrable changes in other organs supplied by the portal system, while undue retention of its secretion becomes immediately evident with the development of jaundice. Enlargements, circulatory disturbances, malpositions of the spleen are easily detected by palpation and often, indeed, by inspection. The pancreas, however, is so far removed from the surface of the body and so hidden by surrounding organs from the inquiring eye and the exploring hand, that any moderate changes in its size and consistency are wholly inappreciable. The points at which the ducts of the pancreas open are such as to render it beyond our power to study changes in the amount and character of the pancreatic secretion. While retention of bile is immediately recognizable by jaundice, retention of the pancreatic juice may be suspected only when grave sequlæ such as acute pancreatitis develop. The studies of recent years concerning the physiology and pathology of the pancreas have brought us valuable clinical assistance, yet we possess to-day no diagnostic sign of pancreatic disease.

In the few remarks that I shall make this afternoon I propose to consider briefly: (1) What criteria do we possess for recognizing gross anatomical changes in the pancreas? (2) What means have we for appreciating disturbance of function of the

pancreas? (3) The diagnostic features of the more important changes in the pancreas.

(1.) *What criteria do we possess for recognizing gross anatomical changes in the pancreas?* The pancreas, situated behind the stomach and colon and extending from the duodenum to the hilus of the spleen, lies for the most part to the left of the median line across the epigastrium. The head, embraced by the descending part of the duodenum, lies just to the right of the median line in the closest connection with the common bile duct. In the normal individual the pancreas is impalpable. In thin subjects, however, with separated recti, it may be possible to feel the body of the organ indistinctly. Enlargements of the pancreas due to inflammatory changes are rarely, if ever, palpable, owing to their tenderness and consequent tenseness of the abdominal wall. Suppurative pancreatitis is, however, often followed by abscess of the omental bursa. This results in a tumor which has certain important characteristics. It is deeply situated behind the stomach and colon. It is immobile and does not descend with respiration. It fills the left side of the epigastrium, extending often across the median line. It differs from a renal tumor mainly in its immobility and in the fact that it does not extend back into the flank.

(2.) *What means have we of appreciating disturbance of function of the pancreas?* The digestive powers of the pancreatic juice are extremely varied. It possesses a digestive ferment for albuminoids, a fat-splitting and emulsifying ferment, an amylolytic ferment, as well as a ferment capable of coagulating milk. Perhaps the most specific of its powers is the fat-splitting action. This function is shared by the secretion of no other organ in the body, though a considerable amount of fat-splitting may be accomplished by intestinal bacteria.

Observations of recent years have shown that the pancreas possesses another extremely important function in addition to its digestive powers. The classical observations of von Mering and Minkowsky,[1] followed by those of Lépine,[2] Hédon[3] and others, have shown that the pancreas exerts an important influence upon the metabolism of sugar in the organism. Complete extirpation of the gland is always followed by rapidly fatal diabetes. Very large portions of the gland may be removed without apparent effect. If, however, but a very small fragment of the organ be left in the body transient or alimentary glycosuria follows.[4] If,

after complete removal of the pancreas, bits of the organ be transplanted subcutaneously, no diabetes occurs so long as the transplanted fragment remains in good condition. Atrophic changes in the transplanted bit of the gland result in the reappearance of the diabetes. (Minkowsky[5] and Hedon.[6]) It is in every way probable that this remarkable influence of the pancreas on the economy is due to an internal secretion, but what this internal secretion may be and what are its relations to the economy are as yet unknown. The recent observations of Opie[7] and Ssobolew[8], however, render it extremely probable that the point of origin of the supposed internal secretion is in the lymphoid islands of Langerhans.

From these circumstances it may be easily seen that in cases in which the symptoms suggest disease of the pancreas, the presence of glycosuria would be an important corroborative symptom. Indeed, the existence of diabetes itself is extremely suggestive of pancreatic disease. In eight out of sixteen cases of diabetes which have come to autopsy at the Johns Hopkins Hospital, Dr. Opie[9] has discovered pancreatic changes, the one constant lesion being hyaline degeneration of the islands of Langerhans.

The possible diagnostic importance of alimentary glycosuria as an indication of pancreatic disease is suggested by the observations of Minkowsky[10] and Wille.[11] The former showed that in instances of partial extirpation of the pancreas, alimentary glycosuria occurred in cases where sugar was completely absent, on a meat diet. The clinical observations of Wille are also important, although the pathological reports are unfortunately incomplete. This author made observations upon 800 patients, examining the urine in each instance after the administration by the mouth of 100 grammes of grape sugar. This test was repeated in the positive cases. In forty-seven of these instances there was alimentary glycosuria. Seventy-seven of the 800 patients came to autopsy. Fifteen of these had shown alimentary glycosuria during life. In all of these cases marked pancreatic changes were found. Disease of the pancreas, however, though in a much lesser degree, was found in other cases in which alimentary glycosuria did not occur. Unfortunately, an accurate description of the nature of the changes is not given, no attention having been paid to the islands of Langerhans.

The experimental observation that a very large part of the pancreas may be destroyed without the subsequent development of

glycosuria is supported by the histories of many cases of acute pancreatitis, notably those observed by Chiari,[12] in which the greatest part of the organ was discharged per ani without serious results. Whether in such cases temporary alimentary glycosuria would occur must remain for further observations to settle. It is, however, on the other hand, true that a very considerable proportion of cases of fatal diabetes show no demonstrable lesion of the pancreas.

Experimental suppression of the pancreatic juice results in a material interference with the absorption of fat, and in some instances of pancreatic disease an excess of undigested fat may be clinically demonstrable in the stools even to the naked eye. But the presence of fat, excepting in enormous quantities, is not uncommon under circumstances other than pancreatic disease (jaundice, diarrhœa), while in many instances of far advanced destruction of the pancreas, the examination of the stools by ordinary methods has revealed little that is striking. More elaborate analysis of the stools tends to show that in addition to the presence of an increased quantity of fat, the diminution of the fat-splitting process as well as the presence of a relatively small proportion of soaps in comparison to the fat acids and neutral fats, are conditions pointing to insufficiency of the pancreatic secretion. Oser sums the matter up by saying: "We may positively assume only that disturbed digestion of fat *may* be an important symptom in pancreatic disease. The increased presence of fat in the stool is of itself, however, no reason for the assumption of a pancreatic disease. If there be no icterus and no disease of the intestine, if an increased peristaltic action, with rapid passage through the intestine of the fæces be not the cause of the insufficient digestion of fat, then suspicion of pancreatic disease is certainly justified."

Interference with the digestion of albuminoids is also characteristic, though not diagnostic of extensive pancreatic disease. The presence in the stools of an unusual number of undigested muscle fibres is suggestive. Sahl's[13] glutoid capsule test may prove of value in determining the albumin digesting powers of the pancreatic juice.

It is, of course, self-evident that in many cases of acute disease the diet of the patient is such as to interfere with the possibility of conducting many of these observations. Time alone will determine their diagnostic value in other instances.

Oser[14] asserts that he has observed in a number of cases of pancreatic disturbance that a large part of the nourishment passes directly through the intestinal canal without being properly digested. "The constant loss of weight despite ample diet, in association with abundant pasty or solid dejecta, a quantity which appears to exceed even that of the nourishment taken by the mouth—this is a striking symptom which demands the especial attention of the physician."

(3.) *The diagnostic features of the more important changes of the pancreas.*

*Acute Pancreatitis.* Acute pancreatitis, as has been demonstrated by a number of observers, usually arises as a result of the entrance through the duct of irritating substances, chemical or bacterial. Opie[15] has recently called attention to the extremely common association of pancreatitis and cholelithiasis, and has demonstrated experimentally and clinically the method of origin of the disease in these cases. A remarkable demonstration of this method of origin is afforded in a recent case by Halsted.[16] In a smaller number of instances the condition has followed direct injury to the pancreas, as in a recent case of Selberg,[17] where the disease followed a kick in the epigastrium by a horse.

With regard to the diagnosis of acute pancreatitis, there is little to add to the masterly expositions of Fitz,[18] who opened the path for the clinical appreciation of diseases of the pancreas. The patient is usually of adult life or middle age, corpulent, and, in a considerable proportion of instances, of alcoholic habits. The history of attacks of biliary colic is not infrequent.

The clinical picture of acute pancreatitis is so characteristic that it should be much more commonly recognized. The day has passed when the diagnosis of acute pancreatitis should be regarded as a good guess. The symptoms begin, as a rule, with sudden intense epigastric pain; this may be referred to a point exactly in the median line, sometimes slightly to one or the other side, often indefinitely localized in the epigastrium. The abdomen, especially in the epigastric region, is distended, rigid and tender; in some instances the pain may be aggravated by pressure over the lower left ribs, which is communicated directly through the spleen to the tail of the pancreas. The pain is commonly of an agonizing character, resisting even large doses of morphia, and sometimes necessitating the use of chloroform. There is vomit-

ing, often obstinate, of mucus, frequently bile stained. Constipation is generally present, though diarrhœa may follow. The temperature is but little, if at all, elevated; the pulse is usually accelerated, greatly, just before death. Cyanosis may be a striking symptom. In a large proportion of cases these symptoms are associated with profound prostration and rapidly succeeded by collapse and death within three or four days.

At first, the symptoms may be confounded with an attack of biliary colic which may, indeed, as in one of my own cases, usher in the symptoms. Especially significant is the character of the pain which is more intense and constant than that of gall-stones. Its intensity, its epigastric diffuse character, with occasional localization on the left side, the profound collapse, so commonly present, should, however, suggest the true condition.

Often a diagnosis of intestinal obstruction has been made, but the epigastric localization of the pain, its peculiar intensity, the absence in the great majority of instances of stercoraceous vomiting, the sudden and profound collapse, should direct the mind of the clinician in the right direction. Especially important is the fact that in these instances the abdominal tenderness and distention may be localized in the epigastrium, and that distended intestinal coils and peristalsis are never observable.

The distinction from a perforative peritonitis is more difficult, but here also, the suddenness and intensity of the symptoms, especially of the pain, the early collapse and the absence of previous history of gastric or duodenal ulcer are important points. In instances of perforation of the gall bladder following cholecystitis the symptoms are in most instances localized in the right side. The possibility of mesenteric infarction should also be considered, and the differential diagnosis may be difficult. The position and intensity of the pain and tenderness may here be valuable points of distinction, together with the absence of those conditions commonly associated with mesenteric embolism or thrombosis (cardiac disease—arterio-sclerosis). It is rarely, if ever, possible to feel the inflamed pancreas, owing to the tenderness and consequent tenseness of the abdominal walls.

While this is the common picture of acute pancreatitis, yet milder attacks may occur in which a diagnosis may be difficult or impossible. In any severe attack of epigastric pain, the nature of which is not clear, pancreatitis should be considered especially if the pain be located to the left of the median line. If the pos-

sibility of acute pancreatitis be borne in mind errors in diagnosis will be less frequent.

The continuance of these symptoms generally in a rather milder form for days or weeks with the appearance of fever, should suggest the development of gangrenous or suppurative changes. In such cases as this careful study of the urine and fæces may reveal evidences of disturbance of pancreatic digestion (fatty stools, glycosuria, fragments of the pancreas in the dejecta, evidence of imperfect digestion of albuminoids).

While suppurative pancreatitis is usually a sequel of acute hæmorrhagic inflammation, yet the onset may be more gradual and indefinite, associated with a continued or irregular fever, perhaps with chills, with epigastric tenderness and rigidity. These may be the only symptoms for a considerable period of time, palpable tumor being often absent. Later, with the development of parapancreatic abscess, the detection of a deep mass in the pancreatic region renders the diagnosis much easier.

How far the symptoms may be masked when the abscess of the pancreas is small is shown by a case which came under my observation while I was a house physician in the Massachusetts General Hospital. A localized abscess of the pancreas at the juncture of the head and tail caused, by pressure, the complete obstruction of the common bile duct, resulting in a clinical picture suggesting carcinoma of the head of the pancreas or of the common duct. There was moderate hepatic enlargement and great distention of the gall-bladder, which was easily palpable. Death resulted from cholæmia.[19]

The successful results of operation with drainage in instances of suppurative pancreatitis have been sufficiently frequent to render its early detection of great clinical importance.

It has been said in an early part of this paper that the retention of pancreatic secretion results in no symptom analogous to the jaundice which reveals the existence of biliary obstruction. Opie,[20] however, has recently made a suggestion which may permit us to modify this statement. The disseminated fat necroses so commonly seen in acute pancreatitis have been shown to depend upon the action of the fat-splitting ferment of the pancreatic juice.[21] While limited fat necrosis between the lobules of the pancreas may follow the escape of small quantities of steapsin, such as may occur under a variety of circumstances, the more widespread lesions are only seen in association with acute pan-

creatitis. The extent of these fat necroses is in some instances so great that it would be remarkable if some of the fat-splitting ferment did not enter the circulation. If this be the case, may it not be demonstrable in the blood and in the urine?

In a case occurring several months ago at the Johns Hopkins Hospital, in which a diagnosis of acute pancreatitis was made by Dr. McCrae, confirmed at operation and at necropsy, Dr. Opie, in a small quantity of urine obtained post-mortem, made the following test for the presence of the fat-splitting ferment. The technique was that proposed by Professor Cassell and Mr. Loevenhardt, and depends upon the decomposition by the ferment of carefully purified ethyl butyrate with the resulting formation of butyric acid. The urine was neutralized by potassium dioxide and divided into two parts, to one of which was added a few drops of ethyl butyrate together with a small quantity of litmus solution. The second part, used as a control, was boiled in order to destroy the ferment if present, and ethyl butyrate and litmus were added. Both specimens were kept for twenty-four hours at 37° C. At the end of this time the unboiled specimen had acquired a well-marked acid reaction, while the control specimen showed little, if any, change. Unfortunately the quantity of urine was so small that the test could not be repeated. Opie's observation and suggestion appear to me to be of very great clinical importance and well worthy of the careful attention of clinicians. If it be possible to demonstrate the presence of a fat-splitting ferment in the urine of acute pancreatitis, we shall have our first diagnostic sign of pancreatic disease.

Five cases of acute pancreatitis have occurred in the Johns Hopkins Hospital; three instances of acute hæmorrhagic pancreatitis, two of suppurative pancreatitis. The first case was that mentioned in Osler's text-book, in which the patient was brought in as an instance of intestinal obstruction and immediately placed upon the operating table, laparotomy revealing the true diagnosis. In the other four cases a correct diagnosis was made in three instances; once by Dr. Bloodgood, once by Dr. McCrae and once by myself. Both cases of suppurative pancreatitis presented palpable tumors greatly facilitating the diagnosis.

*Pancreatic Hæmorrhage.* The diagnosis of those instances of explosive hæmorrhage (pancreatic apoplexy) occurring in the absence of acute pancreatitis is based mainly upon the sudden onset of acute pain in the pancreatic region, with vomiting, fol-

lowed almost immediately by collapse and death. The symptoms differ from those of acute pancreatitis only in their greater acuteness and in their more rapid course.

*Chronic Pancreatitis.* Opie, in an article shortly to appear in the *American Journal of Medical Sciences,* reports observations upon the twenty-nine instances of chronic interstitial pancreatitis which have come to necropsy at the Johns Hopkins Hospital. The commonest cause of the disease appears to be obstruction of the duct by pancreatic calculi, biliary calculi in the terminal portion of the common duct or carcinoma of the head or body of the gland. Ascending infection may result from lesions of the bile passages or duodenum. Persistent vomiting may favor an ascending infection of the duct with resultant sclerotic changes. Chronic interstitial pancreatitis is not infrequently associated with cirrhosis of the liver, and is apparently dependent upon the same general causes. In the pancreatitis associated with duct obstruction and ascending infection, the lesion is interlobular, invading the lobules only secondarily and sparing the islands of Langerhans. Diabetes results only when the disease is far advanced. In that form of chronic pancreatitis occurring with hepatic cirrhosis and in that observed in hæmochromatosis the process is interacinar and invades the islands of Langerhans. With extensive disease of these ducts, diabetes appears to be the rule. A positive diagnosis of chronic interstitial pancreatitis is rarely possible. It is, however, strongly to be suspected in cases of diabetes developing in the course of well-marked cirrhosis of the liver or in hæmochromatosis, especially if examination of the fæces suggests insufficiency of the pancreatic juice.

*Pancreatic Lithiasis.* The diagnosis of pancreatic calculi is rarely to be made during life. Most cases are associated with grave chronic interstitial changes in the pancreas, resulting often in diabetes. The sensations of epigastric pressure or pain mentioned in a number of these cases present little that is characteristic and, as Korte[22] has pointed out, may in many instances be due rather to secondary inflammatory conditions of the pancreas than to the movement of stones. In but few instances has a correct clinical diagnosis of pancreatic calculi been recorded. In Lancereaux's[23] case, attacks of epigastric colic were followed by diabetes. In Lichtheim's[24] case, the patient suffered for a period of six years with severe attacks of epigastric pain, with vomiting and fever, associated with constipation. Seven years

later diabetes developed, resulting in death within a year. After the onset of diabetes the patient suffered with diarrhœa, the stools containing numerous fat crystals and an unusually large number of well-preserved muscle fibres. In the case of Minnich[25] and Holzman,[26] the patient, aged sixty-eight, had previously suffered from severe attacks of gall-stone colic. Subsequently he became subject to attacks of intense pain in the epigastrium and left hypochondrium. This began with a deep, pressing, girdling sensation in the epigastrium and at the left costal margin, which caused the patient to take deep breaths, to press upon the part with his hands and to move to and fro in the room. The pain increased in severity, but became localized under the left costal margin inside of the mamillary line. At the height of the attack the pain radiated around to the spine and up under the left shoulder blade. As the attack passed off it became again localized in a single spot. The stools showed no fat crystals and no gall stones, but characteristic small round grey concretions were found on various occasions, the largest as large as a cherry stone. Microscopically, these stones were amorphous, while analysis showed them to consist mainly of carbonate and phosphate of lime. The case later developed intermittent glycosuria. Leichtenstern[27] has also observed a case where, after attacks closely resembling biliary colic, but without jaundice, calculi consisting mainly of carbonate and phosphate of lime were passed in the stools.

The diagnosis of pancreatic colic can be positively made only in association with the passage of stones. The attacks are closely similar to those of biliary colic, and may be associated with chills and fever. The limitation of the pain, more particularly to the left side, may be suspicious in doubtful cases. Two instances of pancreatic lithiasis have come to necropsy at the Johns Hopkins Hospital. In both of these there were grave sclerotic changes in the pancreas, and in one alimentary diabetes was present. In neither case were there symptoms justifying an ante-mortem diagnosis. Both cases have been reported by Opie.[28]

*New Growths of the Pancreas.* (1) Cysts. Cysts form the largest tumors arising from the pancreas. The larger cysts, those which are clinically recognizable, have been shown by Lazarus[29] to be, as a rule, true proliferating glandular cystomata. The smaller retention cysts and those following degeneration, softening, auto-digestion and hæmorrhage, are rarely palpable.

There is little in the history of these cases that is characteristic. Clinically, the cyst appears as a large retroperitoneal tumor presenting, as a rule, in the epigastric and umbilical regions, particularly upon the left side, and extending out from the costal margin well past the median line. The largest of these tumors fill the greater part of the abdomen. They must be differentiated from cystic renal tumors, hydatid cysts of the liver, mesenteric cysts, retroperitoneal sarcomata and large abdominal aneurysms. From renal tumors they are usually distinguishable by their immobility and in the fact that they do not reach back into the flank. From hydatid cysts they differ mainly in their deep position and in their immobility. From mesenteric cysts they are distinguishable only by their position. The differentiation from retroperitoneal sarcomata is based mainly upon the fact that the latter are solid, while cystic tumors in this region are in the majority of instances pancreatic. Puncture of the cyst and examination of the fluid may be of diagnostic value, though at the present day an exploratory laparotomy is advisable. The presence of bloody fluid or of any of the pancreatic ferments is suggestive of pancreatic origin. Three large pancreatic cysts have been observed at the Johns Hopkins Hospital. In two of these the correct diagnosis was made before operation.

*Malignant Growths of the Pancreas.* Secondary involvement of the pancreas is rarely recognizable intra vitam. The diagnosis of primary cancer of the pancreas often presents considerable difficulty. Large tumors, while they may occur, are unusual. Out of ten instances of cancer of the pancreas occurring in the Johns Hopkins Hospital, in which a positive diagnosis was made post-mortem or at operation, in only three was a palpable tumor present. The differentiation of a large palpable solid tumor of the pancreas from retroperitoneal sarcoma may be extremely difficult. The presence of glycosuria or of other evidence of deficiency of the pancreatic secretion would be strongly suggestive of pancreatic involvement.

The commonest seat of cancer of the pancreas is in the head, which results in the early involvement or compression of the common bile duct. The usual symptoms are consequently those of a complete obstructive jaundice with great distension of the gall bladder and rapid emaciation. These symptoms were present in seven of our ten cases. Extensive metastases in the liver are unusual. In none of our cases were liver metastases demon-

strable intra vitam. The condition is to be differentiated from primary cancer of the bile ducts and involvement of the glands at the hilus of the liver and obstructive jaundice from impacted stone. A positive differential diagnosis between primary cancer of the ducts and cancer of the head of the pancreas is often impossible. The total obstruction and the great dilatation of the gall bladder, which is frequently visible and palpable, serve to distinguish the condition from impacted gall stone where the gall bladder is rarely greatly distended. The symptoms are more suggestive in the presence of glycosuria, fatty stools or evidence of defective digestion of albuminoids.

*Conclusions.* In conclusion it may be said that while we possess, as yet, no diagnostic symptom of pancreatic disease, unless indeed further observation should confirm the possibility of the demonstration in acute pancreatitis of the fat-splitting ferment in the urine, yet clinical and pathological experience have taught us certain combinations of symptoms which justify a diagnosis in various forms of pancreatic disease.

*Acute pancreatitis* should be recognized in many instances. The importance of an early recognition of those cases which go on to extensive necrosis and suppurative para-pancreatitis is easily appreciable.

*Chronic interstitial pancreatitis* is to be suspected under the following conditions: (1) Instances in which diabetes develops in an individual with chronic cholelithiasis. (2) In cases of glycosuria in association with cirrhosis of the liver. (3) In glycosuria in the course of hæmochromatosis. (4) In glycosuria associated with or following symptoms suggestive of pancreatic calculi.

*Pancreatic lithiasis* is recognizable only when calculi are found in the stools.

*Cysts of the pancreas* are usually to be recognized on account of their location.

*Primary cancer of the pancreas* is often latent. The presence of an obstructive jaundice with rapidly developing cachexia and distended gall bladder in association with little or no hepatic enlargement is suggestive of this affection.

The presence of fatty stools—in the absence of diarrhœa or jaundice—together with indications of interference with the digestion of albuminoids are valuable confirmatory evidence of deficiency or absence of the pancreatic secretion.

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# IV. SYMPOSIUM ON DISEASES OF THE PANCREAS

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## 4. Surgical Treatment of Injuries and Diseases of the Pancreas

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If, ten, or even five, years ago one had been asked to write a paper on the surgery of the pancreas he could have dealt with the subject in a very few paragraphs and in a very unsatisfactory way. That so much has been accomplished in the surgery of this viscus within the past few years, speaks volumes again for the rapid progress which surgery is still making. It is scarcely more than a decade since Fitz, who, himself a pathologist and internist, rendered such signal service to surgery by outlining

the surgery of the appendix, gave also to surgery its first distinct impetus toward operative intervention in the acute lesions of the pancreas. That this organ has been about the last of the abdominal viscera to be subjected to surgical procedure, has been due to two things: its deep situation with complicated anatomical relations, and our partial ignorance of its physiology and the peculiarity of its secretion. Moreover, the proximity of the great solar plexus and of numerous important vascular trunks combines to add to the dangers of its conditions which call for surgery and the difficulties of these operations. The pancreas is a racemose gland of soft texture, easily bruised even by contusions on the outside of the abdomen, for acute hæmorrhage has been known to follow such injuries (Robson). Slight injuries at least are unavoidable during certain operations upon the biliary passages, and a case in which I once operated for my colleague, Dr. Stockton, has seemed to show me that even this unavoidable handling may have disastrous results. The fat and areolar tissue which surround the pancreas are continuous with that which surrounds the left kidney and descending colon, which will explain the tendency of pus formed in or about the pancreas to burrow around the left flank, and shows as well the wisdom of posterior drainage.

The pancreas, being six to eight inches long and from one and one-half to two inches wide, is large enough to be injured in various ways. When both walls of the stomach are perforated the pancreas is quite likely to be injured. A very much dilated stomach or a congenitally displaced one may complicate or change indications which would otherwise be plain. The pancreas being so liable to injuries from contusions, it is probable that numerous pancreatic cysts arise from this source. When the organ is so bruised as to allow its peculiar juice to escape, this may lead to fat solution and necrosis, it being possible that such leakage may occur as a result of contusion, implying thereby laceration, or what we speak of as contusion in the brain, and yet, without direct perforation. Should there be an external wound the deeper this extends the greater the liability to such escape. Perforating wounds made from behind may enter the pancreas and extend far enough forward to open the peritoneum. Naturally, next to a division of its vessels, the greatest harm comes from division of its duct.

When necessary, the pancreas may be reached through the

following routes: (1) through the gastro-hepatic omentum above the stomach; (2) through the gastro-colic omentum below the stomach; (3) through the transverse mesocolon back of the colon and stomach; (4) from the loin behind the peritoneum; (5) through the liver (with a thermo-cautery) (Rasumowsky).

The various conditions which may call for surgical intervention upon the pancreas are: (*a*) traumatisms; (*b*) prolapse; (*c*) malignant disease; (*d*) cysts (those due to stones as well as hæmorrhage, etc.); (*e*) calculi (see chronic pancreatitis); (*f*) acute pancreatitis with or without fat necrosis, same with or without gangrene; (*g*) sub-acute pancreatitis; (*h*) chronic pancreatitis (operation mainly called for on biliary passages which produce it; (*j*) tuberculosis.

Experience has not yet shown that in man a complete removal of the pancreas would ever be either justifiable or successful, even though its blood supply or the principal duct were destroyed. Dogs have lived without a pancreas, but as yet no human being has had it removed, save when sequestrated, while the anatomical conditions make it almost impossible; nevertheless, a good portion of it has been and can be spared, and nearly all of a prolapsed pancreas has been successfully removed.

(*a.*) In *acute traumatism* the indications are, first, to check all bleeding; second, to prevent escape of pancreatic juice, to suture, etc.; third, to disinfect the cavity, and fourth, to repair the balance of the injury. More will be said about operative technique later. So far as gunshot wounds are concerned, there are at least four cases on record, three of which occurred during our Civil War, of men shot through the pancreas who lived from twelve to thirty-five days after their injuries, and then died rather from complications than from the pancreatic injuries alone. How many others have had this viscus injured and completely recovered may never be known. Doubtless, if these four could live so long, others have absolutely survived the injury.

In case of injury to the upper abdomen, exploration having been decided upon, and it is to be hoped early, one should estimate, so far as he can, the chances of injury to this organ. This of itself is not easy, especially when the patient is very stout. It is still less easy, if, after opening the abdomen, the stomach be found very full. If there is absolutely no sign of posterior perforation of the stomach, then the pancreas may *probably* be disregarded. If it be really suspected, then it would certainly be

wise either to explore it from the front, or to open at the costo-spinal angle on the left side and explore the retro-peritoneal space with due provision for drainage. Naturally, however, exposed bleeding vessels should be secured, loose pieces of gland should be removed, and any wound which can be reached should be sutured. The time has come now when we may reasonably hold that if a wound be so placed as to make injury of the pancreas probable, it will be considered wise and life-sustaining to make a high laparotomy and explore the region of the pancreas, even without reference to what may have happened to other viscera. For this purpose the generally accepted route will be that through the gastro-colic omentum. After double ligating its vessels and making this opening sufficiently large, the colon may be depressed, the stomach held up and a fair examination may thus be made. Through it the pancreas may be sutured or the peritoneum sutured in front of it and through it; also a drain may be inserted. Moreover, from this cavity a blunt instrument, or even a sharp knife, may be pushed backward to be cut down upon from the loin, the renal and other vessels being in this way carefully avoided. If posterior drainage be thus amply provided for, it would probably be well to close the peritoneum in front of the pancreas. This, of course, would still leave open the question of the propriety of anterior drainage, which would probably be wise if there were much laceration of other viscera. The opening made through the omentum should also be closed with sutures, save for an outlet for the drain. With anterior and posterior drainage thus provided for, one may feel reasonably secure, so far as drainage can make him so. Even when all this has not been done promptly and early, so much of it as is necessary can still be done two or three days later if required, even if it were to reopen the abdominal wound and provide for a posterior drain.

(*b.*) *Prolapse.* Prolapse of the pancreas has been noted in a few cases and experience has shown that this organ comes occasionally quite detatched from its surroundings and quite movable, as indeed it must to permit of cases such as the following: Laborderie, in 1856, tied off a portion of the tail of the pancreas which had prolapsed through a penetrating wound in the abdomen of a ten-year-old girl. (*Gaz. des Hopitaux*, 1856, Nos. 2 and 9.) Kleberg removed some ten centimeters of pancreas protruding from a wound between the umbilicus and the right

costal border. (*Archiv. f. klin. Chir.,* Vol. IX, page 523.) Otis, in the surgical history of our war, reports two similar cases seen in army hospitals. Dugran reports having successfully reduced such prolapse (*Phil. Med. and Surg. Reporter,* 1874, Aug. 22), while Caldwell is said to have had a similar experience in 1816, and yet other cases have been reported by Earl, Allen and Adevoine (Körte). Thus it will be seen that altogether there are eight cases reported of actual prolapse of at least some portion of the pancreas.

(*c.*) *Tumors, malignant and benign.* For malignant tumor of the head of the pancreas there is probably no hope, but in cases of localized abscess or tumor of the splenic portion excision of the splenic end has been successfully practised and is quite justifiable, just as in removal of this portion for gangrene. This is not the place to discuss the symptomatology of pancreatic tumor. The surgical indications here do not differ from those elsewhere, and comprise its exposure, its separation from surrounding tissues, ligation of that part of the pancreas from which it is to be detached and its excision in the ordinary way. It is worth while to remember that Remo collected 127 cases of tumor of the pancreas, in only twelve of which was the disease limited to that organ alone. Moreover, the relations of the pancreatico-duodenal artery to the superior mesenteric artery and its branches make radical removal in most of these cases quite impossible. There is insufficient collateral circulation if these vessels be tied. Moreover, along the upper border of the pancreas lies the splenic artery whose ligation might also be required, although in one case it was tied by Mikulicz without apparent consequence (Takayasu), while in another case Bilroth tied both artery and vein.

After rehearsing these cases, it is worth while to note what has been done in the way of removal of these growths. Krönlein has removed an angio-sarcoma of the head of the pancreas through an opening made through the gastro-colic ligament; Biondi, an adenoma in the same way, and Sendler, a tubercular tumor which he took out through the lesser omentum. Ruggi extirpated a pancreatic carcinoma through an oblique lumbo-abdominal incision in the left side, finding in his case that the pancreas was dislocated somewhat downward. Briggs has removed a tumor of the tail of the pancreas. Routier has enucleated a lympho-sarcoma embedded in the organ. Terrier removed a cystic cancer

weighing some 2,500 grammes, and Malthe has also enucleated a carcinoma from the tail of the pancreas. Nine cases collected by Körte are those at present on record, of which six recovered. Trendelenburg also has removed a large sarcoma, which seemed to proceed from the pancreas, by a posterior lateral incision, through which he also removed the spleen. Bardenheuer has exposed in this way the head of the pancreas for diagnostic purposes. Toffier has even advised to attack from this direction a biliary calculus impacted in the intra-pancreatic space. Braune has also demonstrated the accessibility of the duodenum from the *right* lumbar region.

(*d.*) The question of *pancreatic cysts* has been abundantly dealt with by Senn and by others, and the surgery of these cysts was for some years the only topic mentioned in connection with the pancreas. Operation for such cysts is often made difficult by the adhesions which they contract to all the surrounding organs, adhesions often of exceeding strength so that, for instance, Rokitansky once even tore the colon in trying to separate it from such a cyst wall. These cysts are exposed like any other abdominal cyst or tumor, save that the omentum will probably be found stretched out over them, especially when they are non-adherent, and will need to be parted before sufficient access can be made. The cysts may then be tapped with such a trocar as is used in ordinary ovarian cysts and, after being sufficiently emptied, can be caught with forceps and drawn out as far as possible, in order that they may be the better emptied. A portion of the redundant cyst wall may be cut away and the remaining portion may be sewed to the abdominal wall, following out the method practised first by Gussenbauer, while drainage of the cavity of the cyst may be provided for through a large tube. This is the course to be pursued in most of these instances. It has in a limited number of cases been possible to extirpate such a cyst, since a few of them have been so pedunculated, or provided with a peduncle that could be tied off, that they permitted complete removal of the tumor. The surgeon should be prepared to find more or less of the true tissue of the pancreas stretched out over such a peduncle, should he find a cyst so arranged, and it would probably be best to peel this pancreatic tissue back before ligating the peduncle if it can be done. The mass of fluid discharged from these cavities is sometimes relatively enormous, far exceeding that which can be furnished by

the pancreas under normal circumstances. Fortunately in those cysts where radical measures are impossible, drainage usually is followed by slow contraction and final healing. In one case of my own of enormous cyst, which was pushing the diaphragm upward and the abdominal wall forward and seriously embarrassing the heart and lungs, I could do nothing more than drain, but final healing was secured after months of drainage and almost daily attention with the irrigator. If the character of the cyst and of the cavity occupied by it permit, it would be most desirable to explore in the depths of the same for calculi embedded somewhere in the pancreatic texture, near its head, because certainly some pancreatic cysts are the result of the obstruction of the duct of Wirsung, and removal of such calculi, if they can be detected, should certainly be made part of the operative procedure. So far as calculi by themselves are concerned, it is rare that exact diagnosis of the condition can ever be made previous to operation. The symptoms and signs which they produce may be necessarily so confused with those in the biliary passages proper, as to lead wisely to operation and exploration, and now that large experience is rapidly accumulating with regard to the biliary passages, it is being made plainer and plainer that in case of obstructive jaundice the pancreatic duct should be palpated as well as the biliary.

(*e.*) *Pancreatic calculus.* If once found, its removal by excision is certainly indicated. Whether this shall be made through the texture of the gland, through the extremity of the duct, perhaps aided by expression of the stone if this can be done without much force, or through the duodenum in selected cases, must depend upon the conditions as ascertained at the moment. In some instances it has been possible to draw the stomach so far forward and outward as to bring the duodenum into the field sufficiently to justify opening it and going through it into the diverticulum of Vater, and one should be prepared to do this if necessary.

(*f.*) It seems to me scarcely proper to speak of several different forms of *acute pancreatitis.* I would much rather classify the lesions with Robson, speaking of acute pancreatitis with or without fat necrosis, with or without hæmorrhage, with or without pus and with or without gangrene. In other words, acute pancreatitis is characterized especially in the case in hand by fat necrosis, hæmorrhage, pus or total gangrene. Such a division

as this, it seems to me, can be justified both pathologically and clinically. If, now, we accept Fitz' description of acute pancreatitis as characterized by "sudden, severe, often intense epigastric pain without obvious cause, in most instances followed by nausea, vomiting, sensitiveness and tympanitic swelling of the epigastrium," with prostration, collapse, etc., we may see that when a case presents these features we ought certainly to make exploratory abdominal section. In those conditions where diagnosis as between perforating ulcer of the stomach or duodenum and perforation of the gall duct is impossible, where only a more or less vague tumor occupies the position of the lesser peritoneal cavity, which tumor may present more or less regularly in front, in those cases, I say exploration is the safest and only promising resource. If we are here to check progredient peritonitis and burrowing of pus, this lesser cavity must be emptied and drained, and if in such a case we find that instead of a perforation as above, we have to deal with an acute pancreatitis of either of the above types, then the indication is equally well met. Even when shock has been severe, it has been shown that emptying this cavity and packing it with gauze are of the greatest benefit (Lund). It is the cases of the severest type which most need early and prompt intervention, because these are the cases which die in the shortest time from shock and escape of blood. Those which go on to gangrene offer more hope for surgery. Sometimes the tumor may even be felt in the left lumbar region. In such a case the entire operation may be done from the rear.

When there is time for it, it may be well to follow Robson's suggestion and give three or four daily doses of from two to four grammes of calcium chloride and to give it by enema in double doses after operation. This is done with a view of checking liability of oozing. Robson believes that there is less danger of serious hæmorrhage in patients jaundiced from gall stones than when the jaundice depends upon pancreatic disease. Bleeding from the pancreas is sometimes very troublesome and occasionally fatal even when the operation has been on the gall bladder and when the pancreas itself has not been touched. In these cases it seems to simply ooze blood, and this has been especially noticed in instances of cancer.

There is some as yet mysterious connection between pancreatic disease and hæmorrhage. Hildebrand has suggested that the hæmorrhage in acute pancreatitis is due to trypsin. This

tendency is always intensified by jaundice, or at least in the presence of jaundice, and, though often associated with pancreatic disease, does seem to occur without it. Robson believes that hæmorrhage may be due to the glycerin set free when fat splits up into glycerin and fatty acids, since when injected in small amounts into small animals glycerin produces hæmaturia, as it does in human beings after it has been injected into the uterus to produce abortion.

In 1899, Anders collected from literature forty cases of pancreatic hæmorrhage. He has shown that the immediate effects of bleeding may be survived and that death may occur later from shock and increasing anæmia. Roche divides pancreatic hæmorrhages into those produced by (*a*) injury; (*b*) diseases of vessels, *i. e.*, apoplexies; (*c*) poisons (mercury, hydrochloric acid, etc.); (*d*) toxins (diphtheria); (*e*) diastasic substances, *e. g.*, papain; (*f*) infections.

Parenthetically, it will be seen that at least some of these may lead to the formation of cysts, which have been already considered. Carnot claims that the more acute the symptoms the greater the liability to hæmorrhage, and that it often follows grave traumatism as well as sometimes poisoning by mercury and other chemicals.

The *treatment* of acute pancreatitis is virtually that of peritonitis of the upper abdominal cavity and consists very largely, as Fitz has suggested, in drainage. No time should be lost when suspicious symptoms are present. Simulation of intestinal obstruction may lead to sad waste of time in administration of cathartics, etc. Early operation here is just as wise as in fulminating appendicitis. Even if no pus should be found, no harm would probably accrue. Once the diagnosis is established, drainage, preferably posterior, should be made. It will often be well to make the posterior opening so large as to admit the whole hand. This incision should be made in the median line from the sternum to the umbilicus. In desperate cases it can be done under local anæsthesia. Approach to the lesser cavity must be made through one of the routes already mentioned, ordinarily above or below the stomach. Masses of débris, clot or pus should be rapidly removed and bleeding checked by gauze packing. If the pancreas be found necrotic, so much of it as possible should be removed. In probably every case, if the condition of the patient permit it, opening should be made posteriorly, and this

preferably large, as just remarked. It is possible to drain the sub-phrenic space by resecting the tenth or eleventh rib in the posterior axillary line. (Lund.) This may be called for if symptoms at the base of the left pleural cavity point to a pocket of pus above the spleen. Should this exist, this pocket must be drained, even though the pleural cavity be traversed, though, as a matter of fact, this cavity will usually be walled off by adhesions in such cases. Perforation of the diaphragm which might have been prevented in this way, had it been foreseen, has been reported in one case. (Lund.)

The liability to mistake when symptoms indicate intestinal obstruction or acute appendicitis has been emphasized by Carmalt in two cases reported by him, hence the surgeon should not be taken aback should he unexpectedly come upon acute pancreatitis with fat necrosis when he expected rather to meet with one of the above conditions. W. J. Mayo has recently reported a case of acute fat necrosis at first regarded as gangrenous cholecystitis with perforation opened through the right upper rectus. Only after exposure was the condition appreciated. Beside the enlarged necrotic pancreas, there was found separate from it a thickened gall bladder with a large stone. After removal of this biliary calculus the gall bladder was drained through the right loin by a stab wound, while a large wick of gauze was placed in the right kidney pouch and brought out of the same opening. The abdominal wound was completely closed. The patient recovered. This will well illustrate the possibilities of drainage in this location and on the right side. It illustrates also the sequence of acute necrosis of the pancreas upon cholangitis extending to the pancreatic ducts.

(*g.*) *Treatment of sub-acute pancreatitis.* But little needs to be said about this. It consists for the most part in an exposure of and drainage of the localized abscess. The condition will be more or less blind till the hand is introduced into the abdomen. Median incision will enable more accurate recognition of local conditions, and abscess if found should, of course, be drained posteriorly if possible. If this be not possible, then anteriorly through a large tube with plenty of gauze wicking.

(*h.*) *Treatment of chronic pancreatitis.* This consists in large measure of attack upon the biliary passages, which for the main part are best approached by incision through the right rectus or by Bevan's sigmoid incision, splitting the rectus as far as

needed, the cut being several inches long. Most cases of chronic pancreatic disease are produced by conditions having their origin in the biliary passages and involving the pancreas only secondarily, hence the above statement. Cases of pancreatic calculi causing obstruction of the duct of Wirsung are, of course, well known, and would probably be more frequently reported were operations and examinations more often performed. In some of these cases the pain is referred to the umbilical region, and it has been known to be made worse by walking upstairs or uphill. Most all of these cases are characterized by jaundice as well as enlargement of the liver and gall bladder. Cipriani has emphasized the diagnostic importance of glycosuria, as well as the presence of calculi in the fæces along with thirst and increase in appetite, as enabling the surgeon to better foresee whether calculi are in the biliary or pancreatic passages.

In some of these cases the difficulties met with will be so great as to suggest the expediency of a cholecystenterostomy, which, though far from an ideal operation, may offer the best way out of serious difficulty, especially when there is well-marked obstruction in the neighborhood of the diverticulum of Vater. In this connection Robson has reported a case of complete closure of the opening made between the gall bladder and the duodenum within three months after its formation, and death in consequence. I would like, moreover, to place on record a recent experience of my own where, with a Murphy button, I connected a large and much thickened gall bladder with the colon, the patient passing the button within two weeks. Within three months it was necessary to reopen, and it was found that this opening had completely closed, and I was compelled to do a button operation again. The relief of tension afforded by draining the bile ducts may indirectly drain the pancreatic duct, as Robson has shown, and thus lead to subsidence of the pancreatitis.

The simulation of malignant disease by chronic interstitial enlargement, especially of the head of the pancreas, which has so confused many an operator, should not be a bar to operating in any case of chronic jaundice when health is failing, since much may be done so long as malignant disease be not present.

Calculus embedded in the head or impacted in the duct of the pancreas may be reached by opening the second part of the duo-

denum and exploring the diverticulum and duct, or it may be reached by passing between the duodenum and the hepatic flexure of the colon, going through the peritoneum and then cutting down upon the stone through the pancreas, suturing, if possible, and then putting in a small drain. If it should be wise to go through the duodenum and to open the papilla in order to reach the calculus, this particular portion does not need suturing unless badly torn. The duodenum, of course, should be closed as usual by mucous and serous sutures. Drainage should be made, preferably by posterior opening. Within the past year Robson has reported twenty-two cases of this kind, only one of which died soon after the operation.

Much might be said about the intimate relations of the pancreas, the duodenum and the biliary passages, especially in connection with concretions and the trouble they produce, but explicit advice is very hard to give and it must be enough here to again emphasize the frequency of these complications, one with another, and to urge that in operations on the gall bladder and ducts, the pancreas be not disregarded.

(*i.*) *Tuberculosis.* There is but one matter left to be spoken of, and that briefly. Lohéac has shown that pancreatic tuberculosis may assume either the form of gummatous nodules or diffuse interstitial proliferation. He would explain the relative infrequency of tubercular disease in this location by virtue of the peculiar pancreatic secretion which he thinks to be protective as against this kind of infection. Most cases of pancreatic tuberculosis are certainly due to extension from neighboring foci, and primary tuberculosis here is surely very rare. Should it be encountered it may be regarded as amenable to surgical attack on lines and by methods already pointed out.

I have but one more paragraph to add to the above resumé of the surgical treatment of pancreatic lesions; that is an appeal, an earnest appeal, for the earliest possible intervention in these conditions. So much harm comes from delay, so much good may be done by promptness, that I feel here to apply the rule to which I try to adhere when dealing with acute appendicitis, or with certain injuries to the cranium and brain, namely, *when in doubt, operate.* The cases where one should not operate, and early, are those where he feels very confident that the matter of surgical intervention will not have to be raised at all.

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# V. SYMPOSIUM ON DISEASES OF THE LIVER

## I. Courvoisier's Law

By RICHARD C. CABOT, M. D.
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In 1890 Courvoisier[1] analyzed a large number of cases of diseases of the biliary tract, recording all kinds of statistics regarding them. When tabulating cases with reference to the conditions of enlargement of the gall-bladder, he was greatly surprised to find that when the common bile-duct is obstructed, enlargement of the gall-bladder by no means always follows. In cases of obstruction due to gall-stones, the gall-bladder was rarely enlarged, while if the obstruction were due to any cause other than gall-stones, the gall-bladder was almost invariably enlarged. Thus, out of 187 cases of obstruction of the common duct, there were eighty-seven due to stones. In seventy of these eighty-seven cases (or 80.4 per cent.) the gall-bladder was found atrophied, while in only seventeen cases was it dilated. On the other hand, out of 100 cases in which the obstruction was due to causes other than stone, ninety-two were associated with dilatation of the gall-bladder, while in only eight cases was the gall-bladder small or normal.

So far Courvoisier was judging wholly from the analysis of literature, but in looking over his own cases he found that the figures were equally striking. Out of seventeen cases of obstruction of the common duct by a gall-stone, there were but four with enlargement of the gall-bladder, while out of eighteen cases in which the obstruction was due to causes other than stone, sixteen were associated with enlargement of the gall-bladder. Perhaps as short a method as any for stating Courvoisier's law is as follows:

*When the common duct is obstructed by a stone, dilatation of the gall-bladder is rare. When the common duct is obstructed by other causes, dilatation of the gall-bladder is common.*

Two years later Mayo Robson, the well-known English surgeon, independently came to the same conclusion. In his pamphlet on "Gall-Stones and Their Treatment" he stated the law as follows: "Jaundice with distended gall-bladder is presump-

tive evidence in favor of malignant disease, but jaundice without distended gall-bladder favors the diagnosis of cholelithiasis." Mr. Robson does not seem to be aware that Courvoisier deserves the credit for this law, but of its truth he has no doubt. Among the cases recorded in his recent book on diseases of the gall-bladder and biliary passages, there are thirty-eight in which a definite statement is made regarding the size of the gall-bladder in cases of obstruction of the common duct. Thirty-five or ninety-two per cent. of these cases go to corroborate Courvoisier's rule. Out of twenty-three cases of obstruction of the common duct by gall-stones, twenty-one were associated with small gall-bladder and only two with large gall-bladder. Out of fifteen cases of obstruction by cancer, together with two of obstruction of the cicatrix, only one, a case of cancer, failed to show a dilatation of the gall-bladder. In ninety-two per cent. of these cases, therefore, Courvoisier's rule is borne out. Ecklin (quoted by Osler) finds that out of 172 cases of stone in the common duct, only twenty-eight or sixteen per cent. were accounted for by dilated gall-bladder, while out of 139 cases of occlusion of the common duct by causes other than stone, 121, or eighty-seven per cent. showed dilatation of the gall-bladder.

Kehr,[2] whose experience includes 409 gall-stone operations, is very explicit on the subject: "In obstruction of the common duct by a stone, the gall-bladder is usually small and not to be felt; in obstruction by tumor (cancer) it is usually to be felt as a large elastic tumor under the right ribs."

This rule, therefore, may be taken as tolerably well established by the statistics already quoted, especially as there are, so far as I am aware, no contradictory statistics. Naunyn in his treatise on cholelithiasis, 1896, treats the rule as a well-established one, and makes the absence of dilatation of the gall-bladder one of the main points in the diagnosis of stone in the common duct. But curiously enough Courvoisier's rule seems to have been very slow in penetrating the minds of American physicians and surgeons. This I can readily show by a series of quotations from the more recent American treatises on surgery and internal medicine.

In the American Text-Book of Surgery we find the following statement: "When a gall-stone is arrested in the common duct, there is obstruction to the outflow of bile and the gall-bladder becomes enlarged and may be felt as a rounded pear-shaped

tumor." In Park's Surgery (article on the surgery of the abdominal cavity by Maurice H. Richardson and Farrar Cobb), this statement occurs: "Impaction of a stone in the common duct usually causes marked dilatation of the gall-bladder." In Dennis' Surgery, edition of 1896, article by Abbé, there is no reference whatever to the facts on which Courvoisier's law rests. The same is true of the article by J. W. Elliot in the International Text-Book of Surgery. Among writers on the practice of medicine, Osler, in his last edition, 1898, makes a very clear and pointed reference to the truth noted by Courvoisier. But in the edition of 1895, the same facts are apparently not recognized, or at any rate are not made clear. In Tyson's Practice, 1896, p. 334, the author says: "If the gall-bladder is dilated and can be felt at the edge of the liver, there is probably obstruction of the common duct, and if there is pain and tenderness, the obstructive agent is probably a gall-stone." Wood and Fitz's Practice of Medicine and Pepper's American Text-Book, 1894, make no reference to the subject.

In view, therefore, of the fact that most American writers on medical or surgical aspects of diseases of the gall-bladder, either make no reference to the facts emphasized by Courvoisier, or, as in the case of the articles by Tyson and Richardson above quoted, make a statement directly contradicting that which has found general acceptance in England and on the Continent, it has seemed to me worth while to tabulate from the records in the Massachusetts Hospital all the accessible cases bearing upon this point. This I have been enabled to do through the kindness of Dr. J. H. Wright, of the Pathological Laboratory and of the visiting surgeons of the hospital. The result of my study has been to confirm far beyond my expectations the truth of Courvoisier's rule.

My material consists of thirty autopsies and fifty-six cases which did not come to an autopsy, but in which the condition of the gall-bladder and of the common bile-duct was seen and felt at operation. Among these eighty-six cases were fifty-seven of obstruction of the common duct by gall-stones, and twenty-nine in which the obstruction was due to other causes, almost invariably cancer of the pancreas. Out of the whole eighty-six cases there were but four which violate Courvoisier's rule. The gall-bladder was atrophied in forty-seven cases of obstruction by stone, normal in eight, and enlarged in two. In one of these

two cases the record states that the gall-bladder was "moderately distended," but gives no figures regarding its size. In the other cases, six ounces of bile were evacuated from the distended gall-bladder. These two cases form the only exceptions to Courvoisier's rule out of the total of fifty-seven cases of stone in the common duct.

On the other hand, out of twenty-nine cases of obstruction by cancer of the pancreas or other cause not stone, there were but two in which dilatation of the gall-bladder was *not* found. In one of these the gall-bladder was empty; in the other it was contracted around three gall-stones. With the exception of these four cases, which constitute only five per cent. of the total number examined, every record of the Massachusetts Hospital series in which definite statements are to be found concerning the points at issue goes to confirm Courvoisier's rule.

The explanation of the difference in the behavior of the gall-bladder following the obstruction of the common bile-duct by stone on the one hand, or by other causes on the other, is considered by Courvoisier to be the following:

In the great majority of cases when a stone blocks the common bile-duct, there are or have been stones in the gall-bladder itself. The irritation thus produced has resulted in chronic inflammation with thickening of the wall of the gall-bladder, such that the gall-bladder is no longer distensible. In the great majority of cases it is contracted or atrophied. On the other hand, in many of the cases in which the common duct is blocked by cancer of the pancreas, or other causes outside the ducts, the walls of the bladder are thin and easily distensible, so that the backing up of bile behind the obstruction readily distends them. This explanation is supplemented by another offered by Fenger in the *American Journal of Medical Sciences* for February and March, 1896. Fenger finds that the stone is not always firmly wedged into the duct, but may be loose or "floating." Hence he conceives that in many cases the stone in the common duct has a sort of ball-valve action, whereby the obstruction to the bile is not complete for any length of time. Mayo Robson believes that both these explanations are correct, and that each accounts for some cases. Of course, if the common duct becomes blocked by cancer, when the gall-bladder already contains and has been irritated by stones, we may have the association of non-lithogenous obstruction and a small gall-bladder.

This was the case in one of those tabulated above from the records of the Massachusetts General Hospital.

Now what is the use of this law? Quite obviously, I think, it is of value in the diagnosis of cases of chronic jaundice, with or without enlargement of the gall-bladder. Excluding those cases of dilated gall-bladder due to stone in the cystic duct, and also those of acute cholecystitis in which we rarely have jaundice, we find a group of cases in which the most important signs are chronic jaundice, more or less intermittent, and the presence or absence of enlargement of the gall-bladder.

Now, if it is true, that within this group we can distinguish the curable from the incurable, the operable from the inoperable, the lithogenous from the non-lithogenous cases, chiefly or mainly by observing the indications furnished by Courvoisier's rule, the importance of that rule is not open to dispute. The statistics that I have quoted seem to me to warrant the conviction that this rule can be relied upon to an extent rarely possible in a matter so uncertain as physical diagnosis.[3].

1. Beiträge zur Pathologie u. Chirurgie der Gallenwegen, Leipzig, 1890.
2. Kehr. Gall-Stone Disease, p. 91.
3. From advance sheets *St. Paul Medical Journal.*

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## VI. SYMPOSIUM ON DISEASES OF THE LIVER

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### 2. Intestinal Obstruction Due to Gall-Stones

By LEWIS STEPHEN PILCHER, M. D.
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That a gall-stone, after having entered the intestinal tract, should, by reason of its size, become a cause of serious obstruction to the fecal current, is a proposition that naturally might be greeted with skepticism, especially at this day, when surgeons are frequently placing in the jejunum so large a foreign body as a medium-sized Murphy button, with the confident expectation that after a few days it will appear at the anus, an expectation that is rarely disappointed. It may be remembered, that as recently as 1898, there was reported to this Society, by Dr. Elsner (Transactions Med. Soc. State of N. Y., 1898, p. 282), the case of a woman who passed by the anus two enormous gall-stones, the first one five and one-half inches in circumference

and three inches in length, and the second one three inches in circumference and two inches long; an interval of about one year occurring between the appearance of the stones.

That so fortunate an ultimate result can not always be depended on must nevertheless be admitted. The statistics of Leichtenstern, given in Vol. VII. of Ziemssen's Cyclopædia of the Practice of Medicine, collected previous to 1875, are familiar to the present generation of readers. Among 1,541 instances of obstruction of the bowels from all causes collected by that writer, there were forty-one which were due to gall-stones.

In the later statistics of Gibson (*Annals of Surgery,* 1900, XXXII., 486), such obstructions appear in still greater proportion. Among 1,000 operations for acute intestinal obstruction, compiled by that writer from the literature of recent years, in forty instances the obstruction was due to the impaction of a large gall-stone within the bowel. In 1892, Kirmissen and Rochard (*Archives generales de Medecine,* February 1892), were able to collect from all sources 105 cases of intestinal obstruction by gall-stones.

In my experience I have met with this condition but once. The account of this case is as follows:

In August, 1898, a large well-nourished woman, about sixty years of age, was admitted to the Methodist Episcopal Hospital with acute intestinal obstruction. The symptoms had been developing with increasing intensity for two days. Previous to their inception she had supposed herself in good health; there had been no jaundice, nor other symptom to call attention to any lesion of the gall-passages. The attack had begun with pain in the umbilical region, followed by vomiting, and was regarded at first as a transient fit of indigestion. The vomiting, however, persisted, and after twenty-four hours became fecal in character; the abdomen became tumid; the bowels were constipated. This was her condition when brought to the hospital.

Upon admission, her general condition was good; the early appearance of the fecal vomiting suggested an obstruction in the nearer portion of the small intestine, and the absence of shock and severe pain tended to eliminate the idea of any internal strangulation. As soon as the proper preparations could be made, I opened the abdomen by a five-inch longitudinal incision in the linea alba, the incision beginning above the umbilicus and extending below it. Distended coils of small intestine presented in the wound. The systematic withdrawal of these through the wound upon the outside of the abdomen was begun, but after a very short time was arrested by the apparent adhesion of the loop that was being drawn upon in the depth of the abdominal cavity in the duodeno-jejunal fossa. The finger following down to the point of adhesion felt a hard mass in the intestine

at the adherent point; the adhesions, which were recent and soft and not extensive, were readily separated, and the loop containing the foreign body was brought to the surface. After the usual preparations for incising the bowel, an opening was made into it at a little distance away through healthy tissue, through which the foreign body was removed. The intestinal incision was then sutured, the exposed loop was carefully cleansed and replaced within the abdominal cavity, and the parietal incision was sutured except at its lower angle where an iodoform-gauze mesh was placed as a temporary drain extending down to the site of the intestinal suture. An uncomplicated recovery followed. I have frequently seen this woman since. She is in robust health.

The foreign body proved to be a large gall-stone, nearly spherical in shape, with an average diameter of about one inch and a circumference of three inches. Its size is not so great but one would suppose that it would readily have passed along the whole extent of the alimentary canal without producing any serious obstruction. The conditions which were revealed by the operation show that other causes than the mere physical blockade of the lumen of the intestine by the mass of the calculus contributed very materially to the final catastrophe. I would trace the sequence of these secondary causes in this order: The weight of the calculus was sufficient to prevent the free movements of the loop in which it was held; the mechanical irritation due to its prolonged retention at the most dependent point of this loop produced a circumscribed congestion of the underlying bowel-wall, favoring the transmission of infection and a resulting localized peritonitis which glued the loop, sharply bent upon itself into the depth of the duodeno-jejunal fossa, and thus added the condition of angulation of the bowel to whatever of obstruction the calculus had previously produced. The combination of the two conditions produced the complete obstruction, with the symptoms that led to operation.

It has occurred to me that this case is probably not exceptional, but is fairly typical of what must occur in many of the cases of intestinal obstruction from gall-stones. The conclusion seems to be a reasonable one, that in such cases the final determining factor in the obstruction is not so much the bulk of the gall-stone as it is the secondary development of conditions at some point of the bowel-wall in the downward course of the calculus, which lessen the contractile propulsive power of the bowel-wall. Such local paresis readily favors angulation, and the progressive development of the symptoms of complete obstruction rapidly follows.

These stones enter the intestinal canal presumably by ulcerative perforation through the adherent walls of the gall-bladder and the duodenum.

In the literature of the subject it will be found that great diversity of opinion has existed as to the character and intensity

of the symptoms which have attended the earlier evolution of these cases up to the time of the final attack of obstruction. That, as in the case of my patient, there should have been entire absence of any notable abdominal symptoms has not been unusual. Rarely do symptoms of obstruction arise at once upon the entrance of the stone into the cavity of the duodenum. Not until the lower portion of the small intestine is reached does the obstruction declare itself, as a rule. It is fair to ask why the stone should be arrested here if it has not been too large to pass along the higher portions of the intestinal tract. The dilatability of the intestine, the propulsive power of its muscular wall, is not any less here than in the part already passed through. The thinner and less vascular coat of the ileum and the extreme mobility of its numerous coils render it, however, more prone to what I may call decubital irritation from the presence within it of a foreign body like a large gall-stone, and the development of circumscribed peritonitis, with its attendant paresis and probable adhesion and possible acute angulation. I am inclined to assign, therefore, to "decubital irritation" the most important role in the causation of intestinal obstruction by gall-stones. I emphasize it in the present communication because its general presence and influence in the earlier course of these cases have not hitherto received that notice by writers upon this subject which they deserve, although the frequency with which necrosis of the intestinal wall and circumscribed peritonitis have been found in cases which have come late to operations, has been noted by observers.

The diagnosis of gall-stone as the cause of an intestinal obstruction must often be obscure and uncertain. This will necessarily be the case in those not infrequent instances in which the symptoms of obstruction declare themselves suddenly and without previous signs of a cholelithiasis. Most of the symptoms that attend the condition of gall-stone intestinal obstruction are at best suggestive rather than positive. The greater number of these cases occur in women over fifty years of age. The obstruction is in the small intestine, and retroperistalsis is early induced, provoking copious vomiting that soon becomes fecal; yet without the signs of shock and early collapse that mark an internal strangulation. For the same reason excessive tympany does not develop. The obstruction may be incomplete, and a chronicity or intermittence of the symptoms may mark the case. In a very considerable proportion of cases, over fifty per cent., according

to Naunyn (*Klinik der Cholelithiasis*, Leipzig, 1892, p. 173), a spontaneous moving on of the blockading calculus is ultimately effected, and recovery ensues without surgical interference.

All these symptoms, however, are quite as likely to be caused by an annular carcinoma and, with the exception of the intermittence or spontaneous relief of the symptoms, by internal hernias and constricting bands.

If in a given instance the physician could be positive that the case is one of gall-stone obstruction, he might be justified in adopting an expectant attitude. In the present state of intra-abdominal surgery, however, the onus of adopting such an attitude toward any case of intestinal obstruction has become a very serious one, since exploratory abdominal section *per se* has become established as a relatively safe procedure, and since by such section alone can a positive diagnosis be made. The establishment of the diagnosis of the particular cause of any intestinal obstruction is, of course, in the line of scientific precision, and thoroughness and exactness of investigation to arrive at a conclusion are always to be employed before proceding to the abdominal section, but it is not to be overlooked that this section is the most important means of diagnosis, while it at the same time opens the way for the application of the supreme means of relief.

Of the forty cases of operation for gall-stone obstruction gathered by Gibson, twenty-one were fatal. The length of time that the symptoms of obstruction had existed, and the general condition of the patient at the time she (three-fourths of the patients were women) was brought to the operating-table, are unfortunately not given by Gibson, for on these points must hinge considerations of the greatest importance. The tendency to death is generally by exhaustion and auto-intoxication; in some cases a general peritonitis develops and closes the case. Treves (Intestinal Obstruction, p. 329) gives the average duration of the final acute attack as seven days, the shortest period being four days, the longest fifteen days. It is obvious that if operative interference is to be attempted, the probabilities of success must steadily decrease with the lengthening of the time since the onset of the obstruction symptoms. The best results are only to be obtained by resorting to operation before the recuperative powers of the patient have become exhausted, and while the local damage is still slight. As soon, therefore, as the symptoms of obstruction are positive, whether the presumption of a gall-

stone as its cause is entertained or not, the surgeon is justified in opening the abdomen, first as a diagnostic—and, secondly, as a therapeutic procedure. The presumption that the cause of obstruction is a gall-stone should not induce the adoption of the policy of delay in the hope that the obstructing body would eventually pass, but such a presumption may rather stimulate to early operation, for it creates the expectation of encountering a condition, when once the abdomen is opened, which is readily and quickly amenable to simple surgical efforts.

Doubtless, if this recommendation is followed, some cases will be operated upon that would have recovered if they had been left alone: possibly some operative fatalities may also occur among these same cases: but the proportion of operative fatalities among patients unnecessarily operated upon will bear but an insignificant relation to the increased number of operative recoveries among patients who but for this early interference would have died as the result of gall-stone impaction.

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## VII. SYMPOSIUM ON DISEASES OF THE LIVER

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### 3. The Technique of Gall-Bladder and Duct Operations

By SAMUEL J. MIXTER, M. D.
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In a short paper on this subject much may be assumed to be the common knowledge and practice of the general surgeon, and may be passed over with simply a brief mention. There are, however, certain differences in methods that are so radical that they call for more careful discussion. The views advanced by the writer have been arrived at as the result of a very considerable number of operations in this region, as well as learned from the successes and failures of others.

Indications for operation are not within the scope of this paper: but I cannot refrain from the remark, in passing, that operations on the gall-bladder are too seldom performed, or performed too late for the best good of the patient. The general practitioner is, however, learning that attacks of pain, and other symptoms pointing to trouble about the gall-bladder, call for the surgeon, as much as do symptoms pointing to the appendix.

Only one word in regard to what may be called preparation: In my opinion the surgeon should *not* wear rubber gloves while performing operations upon the gall-bladder. So much depends upon the sense of touch that even the hand trained to operate, as a rule, in gloves cannot do as good work with as without them.

The incision to reach the field of operation is best through the outer part of the rectus parallel to its fibres. Should more room be needed, the incision can be carried upward and across the rectus. The operations usually performed are:

(1) simple incision of the gall-bladder;
(2) removal of the gall-bladder;
(3) incision of the cystic or common ducts;
(4) cholecystenterostomy.

It is impossible in most cases to determine beforehand which of these procedures may be necessary; and it is only when the abdomen is opened and the eye and hand can explore, that the surgeon is able to map out the operation. Should, as is so often the case in late operations, the gall-bladder and all the surrounding structures be surrounded and bound together by adhesions, these must first of all be thoroughly separated, and the gall-bladder, ducts, and pancreas carefully examined. Stones in the gall-bladder are generally easily detected, even if the organ is enlarged and tense. Small stones in the common and even cystic duct, and still more in the hepatic duct, may easily escape the careless or hasty operator. The best method of examining the ducts by touch is to pass the forefinger of the left hand through the foramen of Winslow, the surgeon's back being towards the patient. The duct, portal vein, and the artery are then easily felt between the finger and thumb. Before proceeding farther, the field of operation should be carefully surrounded by gauze packing in every case, for no one can tell whether the fluid in the gall-bladder will be sterile (as is generally the case) or not.

If the gall-bladder is to be opened, it may best be secured by two ligatures passed through its wall by curved needles. These do much less damage and take up less room than forceps. Should there be a large quantity of fluid in the gall-bladder, it may nearly all be removed by means of an aspirating-needle or trocar, and, if there is reason to think that it is septic, the bladder is easily washed out without the escape of its contents. The bladder is then incised between the two ligatures, and gall-stones or pus thoroughly removed by scoop, curette, forceps, and syringe.

If it is decided not to remove the gall-bladder, the question arises, Shall we sew it up, as we would the stomach, or drain it? For my part, I believe thoroughly in *drainage in all cases.* Even if the contents are sterile, and we have an apparently normal gall-bladder to deal with, some stone overlooked or driven farther into the duct, a blood-clot, or a swelling of the mucous membrane following manipulation, may cause an obstruction of the duct and distension, with, perhaps, a leak or inflammation. I have in the past sewed up many gall-bladders without, I am glad to say, any bad result; but after having seen autopsies where it has been done by good surgeons, I shall do it no more. What has been called the "ideal cholecystotomy" is, to my mind, far from being ideal. Drainage of the gall-bladder, under these circumstances, is like drainage after removal of an acutely inflamed appendix; if there is no need for drainage, the wound will close so soon that only a few days are lost; whereas, if it is needed and not employed, the patient is lost.

Now, how shall we drain? The old and common method of stitching the gall-bladder to the abdominal incision, or even the skin, seems to me to be the most crude and happy-go-lucky method of all. It is impossible for the most expert with the needle to make a tight joint, as can be made, for example, between coils of intestine. Of course, packing can be placed about the gall-bladder, but there is bound to be an escape of bile into the dressing, if not into the abdominal cavity.

The method that I have used for years, since it was first called to my attention, is to tie a glass tube with a flaring end tightly into the gall-bladder, using a heavy silk ligature. The ragged end of the bladder is then trimmed away, and it and the tube are enveloped in a small packing. A rubber tube being attached, all the bile for days may be carried through the untouched and unsoiled dressing into a bottle hung below the bed. Another advantage that this method has is that the gall-bladder is not put on a stretch to fasten it to the abdominal wall, and the patient has less subsequent pain and dragging in the wound.

Should we wish to remove the gall-bladder, either after or before opening it, the operation is a simple one. There is no need of a cautery-knife or special instrument. The peritoneum being divided at its reflection from liver to gall-bladder, the latter is easily torn out of its bed by the fingers or blunt dissector till the cystic duct is reached, which can be tied and cut, and the

operation is done. Sometimes there is quite a space between the cystic duct and artery, and they may have to be tied separately, though not often. I have never seen a hæmorrhage from the torn liver substance that a packing of gauze would not stop in a few minutes.

Mayo's method of dissecting out the mucous membrane is ingenious, and may be useful when the gall-bladder is firmly embedded in adhesions, but in ordinary cases I seen no advantage over total extirpation.

Operations for the removal of stones in the common duct are among the most difficult and dangerous of surgical procedures. The surrounding structures are deep, of great importance, and easily wounded. The position of the stone having been determined by the examining finger, it may be removed according to its distance from the bowel and the feeling of the operator, either through the enlarged cystic duct, the incised common duct, the incised duodenum, or even by crushing by external pressure, —a most satisfactory method. Should the stone be situated in the hepatic duct, it may often be grasped by forceps or spoon; but whoever has had much experience in hepatic surgery must have felt the disappointment of having the stone slip farther back into the liver and not be able to reach it again.

Shall we stitch up the openings that we make in the common duct? If we do, it is very convenient to use Halsted's mallets. Personally, I have found that those cases where no sutures are used do as well, if not better, as those where they are.

Cholecystenterostomy is one of the few operations where I still use the Murphy button. I do not see why the elastic ligature might not be used here with the best result.

One thing the operator should always remember is that a biliary fistula cannot be, and really should not be, closed unless the common duct is open.

Among the most trying of surgical emergencies is the hæmorrhage that sometimes follows operations on profoundly jaundiced patients. Nothing is more trying than to see a patient, that has apparently come through a severe operation in good shape, dying of that ghastly oozing that cannot be stopped. The use of gelatine, both before and after operation, has been suggested. I have had no opportunity to try it. It has occurred to me that finely divided gelatine, sterilized and, perhaps, mixed with a little adrenalin, might be used on the cut and torn surfaces.

In conclusion, I wish to emphasize the importance in many cases, where the abdomen is opened and the patient is in good condition, of a thorough examination of the gall-bladder and the removal of the stones at least, if they are present, or, as I generally prefer, the gall-bladder itself. The operation should, however, be as carefully and thoroughly done as though it were the primary and not secondary one.

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## VIII. SYMPOSIUM ON DISEASES OF THE LIVER

### 4. Cholecystectomy for Gall-Stones

By C. L. GIBSON, M. D.
NEW YORK

The removal of the gall-bladder has been one of the resources of surgical therapeutics for twenty years: but it has only recently become a recognized method in the treatment of cholelithiasis. Even now its employment is not general, though its use is increasing among the surgeons with an extensive experience in this branch of surgery. In this country it has been but little employed in the treatment of cholelithiasis except as a matter of expediency. I think one reason for this infrequency is to be found in the class of cases of biliary surgery that come to operation; they are generally advanced,—and in wretched condition, permitting only of the simplest measures of relief.

In asking for a consideration of the advantages of removing the gall-bladder,—under certain favorable conditions,—for the relief of cholelithiasis, I assume that the weight of evidence is in favor of these elementary propositions.

1. Gall-stones are the products of disease of the biliary passages, principally cholecystitis, and not their cause.

2. The mechanical disturbances produced by the impaction of gall-stones in the bile ducts are almost invariably due to the presence of stones originating in the gall-bladder. It is granted that stones may occasionally be found in the hepatic and other ducts; but it is held that with rare exceptions they give rise to no disturbance owing to their very small size.

If the foregoing is true, an individual with a predisposition to cholelithiasis should be the better for getting rid of his gall-bladder, provided this form of treatment is not attended with

drawbacks disproportionate to the advantages to be gained, and provided also that this method can be proved to possess possibilities unattainable by any lesser means. The specific claim, therefore, that I would make for cholecystectomy is that it should be considered as a *curative* operation, as it removes the cause of the disease. Certainly it is in accordance with the line of treatment we consider the best for certain other conditions, such as pyosalpinx, and more especially appendicitis, which is not without a certain analogy to cholelithiasis.

It is not denied that simple drainage of the gall-bladder is a perfectly good operation, which fulfils the demands of the majority of cases. It has also been proven definitely that drainage readily tends to sterilization of the gall-bladder. It is also acknowledged that the actual reformation of stones in the drained gall-bladder is exceedingly rare, and is usually due to some definite accident, as a silk suture becoming the nucleus of a calculus. There is no guarantee, however, that the sterilization by drainage will persist, and that recurrence of the cholecystitis, the essential disturbing element, can be eliminated. Such disturbances do take place, and the consequent inflammatory reaction results in renewed adhesions to the neighboring organs, provoking pain and secondary disturbances. Such, at least, is the belief of Hans Kehr, of Halberstadt, founded on an experience surpassing that of any other surgeon. He is a comparatively recent convert to the value of cholecystectomy, which he has performed considerably over one hundred times. He found remote disturbances in over seventeen per cent. of his drainage cases, but only one per cent. after removal of the offending organ. I feel quite sure that if our own cases in this country were followed more thoroughly, we could increase the proportion.

The second important disadvantage overcome by cholecystectomy is the avoidance of long-continued biliary or mucous fistulæ following cholecystotomy. It has been held almost as an axiom that a persistent fistula after drainage means an incomplete operation, the path of the bile to the duodenum remaining obstructed. And while all this is quite true, very exceptionally a fistula does remain after irreproachable operative conditions; but what is more common, the fistula, while eventually closing, does so only after a period of time, which brings discomfort to the patient and discomfiture to the surgeon.

There is a third and essential point in favor of extirpation which is of no lesser importance. The present time sees everywhere the trend of prophylaxis, the development of preventive medicine. The scientific world recognizes the steady increase of the ravages of malignant disease. It also acknowledges the in-

fluence of chronic tissue irritation as a predisposing element. The frequent inter-relation of gall-stones to cancer of the biliary passages is sufficiently established. One observer puts the proportion of patients the subjects of biliary lithiasis, who subsequently develop cancer as high as fourteen per cent. May I not, therefore, justly claim that the removal of the gall-bladder as a prophylactic measure is a desirable addition? These, then, are the main advantages upon which I would confidently rest my plea in favor of this operation. There are also minor points of usefulness whose sum total considerably extend the indication for its performance. Among these may be mentioned:

Obliteration of the cystic duct. In this condition, cholecystectomy rather than drainage is certainly the logical operation.

Impaction of a calculus in the cystic duct which cannot be dislodged into the gall-bladder. Excision of the gall-bladder and ligation of the duct after removal of the stone.

Hæmorrhagic condition of the mucous membrane of the gall-bladder. The removal of the gall-bladder will act as a prophylaxis of the hæmorrhage, which sometimes occurs as a dangerous, —usually fatal post-operative complication.

As a matter of expediency, when the gall-bladder is so situated or so shrunken as to render satisfactory drainage impossible.

In phlegmonous, ulcerative or gangrenous conditions, it is the only satisfactory operative treatment.

Notwithstanding the several advantages I believe extirpation of the gall-bladder to possess, I would not wish to convey any impression that it may or should be used as a routine measure, nor will it ever displace simple cholecystotomy. In general terms I would say that it is indicated when the anatomical and pathological conditions allow of its easy and speedy performance, that is, if it does not materially add to the technical difficulties or dangers of the operation. The pathological gall-bladder, particularly the distended variety, is usually easier to remove than the normal, as the line of cleavage in the cellular tissue between it and the liver becomes better defined. In cases in which I have performed it, it has been a matter of the greatest simplicity, and requiring often only a minute or two for its successful separation. When the gall-bladder is buried in adhesions, when inaccessibly situated, and the structures at its neck cannot be well defined, it is better left alone, unless there are special pressing indications for its removal.

My practice is usually to ligate the cystic duct *en masse*, applying, however, a separate ligature, if possible, to the cystic artery. The edges of the stump are brought in apposition by sutures. If a stone is to be extracted from the cystic duct, the latter is

simply well-anchored by clamps or fixation sutures before the gall-bladder is cut away. Gauze drainage down to the stump. This operation, however, is not to be undertaken if a complex or obscure condition of the biliary tract exists. It is so easy to overlook some of the complicating conditions,—a stone in the retro-duodenal portion of the duct, a tumor of the duodenal papilla, interstitial pancreatitis, or tumor of the pancreas, that one will abstain from employing it unless the situation is particularly favorable for thorough examination and there is no obstructive jaundice. Occasionally one may be forced, as I have been, to remove the gall-bladder after extraction of a stone in the common duct. In such a case the duct should be drained, not sutured, or drained by anastomosing the common duct to the intestine, a procedure which I believe will come to be recognized as feasible and proper. Performed under the above conditions and with a proper realization of its indications and limitations, the operation should not have any greater mortality than the older method of cholecystotomy. In Kehr's series of over one hundred cases the mortality was only three per cent.

The various objections to this procedure, with the possible exception that it is somewhat more of an operation, I do not entertain very seriously. The reservoir functions of the gall-bladder seem of doubtful value, and according to comparative anatomy somewhat accidental. I entirely reject the opinion that the gall-bladder should be saved for fear, a second operation becoming necessary, a valuable or necessary guide to the common duct would be sacrificed. Actual experience has shown that the previously drained gall-bladder is practically obliterated in a mass of adhesions. In a recent post-mortem of one of my colleague's cases, the gall-bladder was unrecognizable, and was found only after a most prolonged search.

To sum up my position in regard to cholecystectomy for cholecystitis and cholelithiasis, I would say: 1. In properly-selected cases it is an extremely simple and safe operation. 2. It is a *curative* operation, doing away with subsequent attacks of cholecystitis, and more remotely of renewed stone formation. 3. It eliminates the disagreeable possibilities of long-continued biliary and mucous fistulæ. 4. In certain technical conditions, such as atrophic, or inaccessible bladder, obliteration of the cystic duct, or impacted stone in the cystic duct, and in hæmorrhagic condition of the gall-bladder. 5. It is a prophylactic measure against the development of carcinoma on the site of long-standing irritation. 6. It offers the prospect of a shorter and easier wound healing and convalescence. 7. It is not to be employed indiscriminately, but has its proper limitations and contra-indications.

# IX. SYMPOSIUM ON DISEASES OF THE LIVER

## 5. Concerning Hepatic Syphilis

By SIMON FLEXNER, M. D.
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The liver has played an important part in the history of our knowledge of syphilis. The oldest views upon the disease held that syphilitic ulcers were the result of the corruption of the humors, the origin of which was to be looked for in the liver. At about the same time, with the prevalence of this conception there arose another, according to which the liver became affected consecutively to the disease of the genital organs. Some writers, indeed, denied all syphilitic affection of the liver, and among them was Morgagni, who states (*De Sedibus et Causis Morborum*) that he does not remember to have found the liver diseases in the bodies of persons who had suffered from syphilis.[1]

The first conclusive observations upon luetic lesions of the liver were made by Dittrich,[2] whose papers contain the first comprehensive description of the appearances of the disease. He described yellow, dry, firm, solid and almost round masses which, while previously seen in the liver, had, according to his view of their nature, been misinterpreted. Thus, for example, Budd had regarded them as encapsulated nodular tumors, the outcome of accumulations of caseous material in the dilated bile ducts, and Oppolzer and Bochdalek looked upon them as healed cancerous nodules. Dittrich insisted on their luetic nature, and thus prepared the way for rapid advances in our knowledge of the visceral lesions of syphilis. On the other hand, his views of the composition of the tumors were erroneous, for he regarded them, not as new growths, but as encapsulated unorganized exudates. He believed that there occurred in the course of syphilis "bacony" exudates, which, after going through certain transformations, remained behind, imbedded in the tissues in the form of crude masses.

The first accurate account of the nature, development and varieties of syphilitic lesions of the liver we owe to Virchow. He not only brought the yellow hepatic nodules into relation with the general lesions of constitutional syphilis, but showed them to be new formations, taking origin either from normal connective tissue or from a new connective tissue, the result of a preceding chronic interstitial hepatitis. Virchow also recognized lesions of different nature or slighter grade. Thus, he described a con-

dition of simple hyperplasia of the interstitial tissue, an interstitial hepatitis, and the formation of bands of connective tissue, which eventuated in depressed scars, or produced a multi-lobulation, now regarded as one of the chief types of syphilitic disease. Within the fibrous bands, gummata may be present. The gummata are found on the superior surface of the organ most frequently, in which case a diffuse perihepatitis may exist; or they occur in the depth of the organ, or near the porta of the liver in connection with the capsule of Glisson. It is only very rarely, and then in the case of small nodules, that they are found scattered free in the liver parenchyma, for wherever they occur they tend to be imbedded in dense fibrous tissue. The size and general appearances of the nodules do not call for description in this place. You are all familiar with their characters and with the manner of their production. Virchow's views of the proliferative nature of the nodules have received such general confirmation that the matter is no longer one of doubt. Even the central, yellow, amorphous mass is now known to be the product of retrogressive changes, and not the remains of an exudate which had failed to be converted into organized tissue—the view previously presented by Dittrich. From the several forms of hepatic lesions of syphilis Virchow removed amyloid degeneration, which he believed to be an essentially passive, and no longer syphilitic, affection, the origin of which was to be sought in some cachectic state.

The knowledge and views of syphilitic disease of the liver held at the present time do not differ from those here laid down. Dittrich brought the first indubitable proof of the existence of such disease; and Virchow defined it, described all its varieties, their mode of formation, and the ultimate fate they underwent, to which facts there has been made in the course of nearly half a century no important addition.

Syphilitic affection of the liver is expressed in a variety of ways. The occurrence of icterus in the course of lues indicates the involvment of this organ. Now generally admitted as one of the coincident manifestations of the disease, no adequate explanation of it has been produced. Alterations in the bile vessels, in the liver cells, the mucosa of the duodenum, and the gastrohepatic lymph glands have all been assumed, but not proved. That the condition is of specific nature is not probable; but upon what transitory changes, the effects of the action of the syphilitic virus, it depends, is wholly conjectural.

In a similar manner, the passive hyperæmia of the liver is not a specific affection; but doubtless it arises in consequence of diseases of the heart and arteries, in which organs the poison com-

monly produces alterations leading to disturbances of the mechanics of the circulation.

There is not entire unanimity of opinion regarding the occurrence of ascites. Bamberger found it only once in the absence of concomitant kidney affection; Julien found it with gumma, sclerosis and the hypertrophic form of interstitial hepatitis; Thierfelder regards it as common, whereas Mauriac holds its association to be limited to the contracted liver. The weight of opinion is in favor of ascites being present in syphilitic disease of the liver, but under certain conditions only. It may be expected in general cirrhosis, and if the portal vessels are pressed upon by gummata, constricted by scars, or obliterated by endophlebitis. In gummatous hepatitis ascites does not appear unless there is concomitant disease of the kidneys or heart, or chronic indurative peritonitis.

The syphilitic inflammations, using this term in the older and generally accepted sense, are referable directly, perhaps, to the action of the specific virus or poison. Should we use analogies derived from the manner of action of known pathogenic organisms, we would doubtless say that the specific lesion of syphilis as it has been observed in the liver is the gumma; and that the circumscribed and diffuse growths of connective tissue that characterize the interstitial change are probably the result of the action of some diffusible, soluble poison—perhaps a toxine—derived from the growth of a specific organism—the parasite of syphilis. A comparison with the manner of action of the tubercle bacillus which, at one time, gives rise to tubercles, and at another to diffuse fibrous tissue overgrowth, would support such a view.

I shall consider the disease according to the main types as defined by Virchow. The contribution which I may make to the subject has grown out of a statistical complication of the cases of hepatic syphilis contained in the autopsy protocols of the Philadelphia Hospital for the year 1867 to 1901. The cases were selected and abstracted by Mr. Skillern, of the Medical School, to whom I wish to express my indebtedness. The entire number of autopsy records examined was 5,088, and among these the records of eighty-eight cases of hepatic syphilis were encountered. The types of disease were the interstitial hepatic, gummatous, perihepatic and amyloid. The first made up about half of the cases, next to which in frequency came the gummatous form (twenty-three case); perihepatitis was observed sixteen times; amyloid disease seven times.

Of considerable importance in such a classification are the instances showing the so-called syphilitic scars. These were en-

countered thirty-eight times. They were located superficially, generally upon the superior and anterior surfaces of the organ, were commonly multiple, and at times penetrated to some depth. In some instances gummata were found in the same organ. Whether all such scars are properly to be regarded as healed gummata is, perhaps, a question that is open to debate. No one will, I think, doubt that the usual methods of sectioning the liver do not suffice for entirely eliminating the presence of gummata any more than of other nodular formations. Frequently the reward of discovering such a growth comes with prolonged search, during which the liver is virtually hacked to bits.

There can be no doubt that many gummata disappear from the liver, either as a result of treatment or spontaneously. The analogy with similar lesions on parts of the body more exposed to exact observation renders such a result probable, and I consider the scars referred to as adding to the proof of such an issue. When the scars are accompanied by fibrous bands penetrating the tissues and containing remains of gummata, then their nature may be taken as demonstrated.

Virchow left the question of the disappearance of hepatic gummata in doubt, though inclining to the view that absorption does take place. On the other hand, he pointed out that the rich growth of scar-like tissue about the nodules might interfere with complete removal. Later writers speak positively upon their disappearance, and the favorable prognosis of gummatous hepatitis depends largely upon the tendency to undergo healing.

Indeed, this form of syphilitic lesion is often accidentally encountered when partially or completely healed, at the autopsy table, no disturbance of the functions of the liver having been observed during life. And what is more conclusive still, are the statements of Mauriac (quoted from Neumann, *Syphilis*, p. 429), who observed in instances of profound emaciation and loss of strength from supposed carcinosis, that iodide therapy brought about cure. The prognosis, according to Neumann, is the more favorable the younger the individual, the less advanced the lesion, and the fewer the complications. That even severe ascites, the effect of the pressure exerted by gummata, may gradually lessen and disappear, is indicated by the following case, which came under my observation. The case is not less instructive because of the associated syphilitic ulcer of the stomach, perforation of which into the peritoneal cavity was the immediate cause of death. As the case has already been reported in detail,[3] only the history and such portions of the autopsy protocol as refer to the hepatic lesions will be given:

The case was that of a man, fifty-two years of age, whose illness extended over a period of three years. The man was a patient of Dr. Irving Miller, of Baltimore. He was in the Johns Hopkins Hospital on two occasions, but only remained to be examined; he was not treated there.

Dr. Miller writes: "I first saw the patient in August, 1892. At that time he was a large, fairly well-nourished man, about six feet in height, and weighing 170 pounds. His average weight was 200 pounds. His occupation was that of a showman. The first appearance of his illness was at the preceding Christmas, while filling an engagement in Boston, and followed a drinking-bout and exposure. It was ushered in by a severe spell of vomiting, which persisted for several days, and was followed by irregular chills. This condition of affairs continued off and on until the summer, when I first saw him. At this time the temperature ranged around 101° F.; there was a tumor in the splenic region, extending nine centimeters below the costal margin, and forward nearly to the umbilicus. Exquisite tenderness was present all over the area of dullness. I regarded the tumor as being the enlarged spleen. The urine contained bile pigment, and there was some pigmentation of the skin. Neither sugar nor albumin was found in the urine. There was little change in the conditions noted for several months, when the splenic tumor was found to have diminished markedly, and ascites to have appeared. The dropsy increased, involving the legs and scrotum. The patient was tapped for the first time on April 20, 1893; three and one-half gallons of fluid were withdrawn. The tapping was repeated at intervals of from six days to two weeks, the amount of fluid withdrawn varying from two to six gallons. The relief afforded by the paracentesis was so great that the operation was resorted to to enable the patient to go fishing the next day. The accumulation of fluid continued for two years, and then began to diminish, until very little fluid could be detected in the abdomen. Purges were occasionally administered. The morphine habit was acquired. The night before his death the patient dined abundantly on fried crabs and ice cream. When I saw him a few hours before his death, there was intense abdominal pain and tympanites. Pulse thready, weak, 130 to the minute, profuse sweating. He died in the early morning."

The patient had been in the hospital on two occasions—in February, 1893, and March, 1894—for examination. On his first entrance Dr. Hewetson found a full abdomen, no increase of liver dullness, the spleen enlarged and palpable three-fourths of a hand's breadth below the costal margin. When he returned in 1894, he reported having been tapped at intervals of about ten days, in all sixty-five times. After the removal of 9,700 centimeters of fluid the liver could be felt below the ensiform cartilage; it was hard and apparently bound down by adhesions. A probable diagnosis of hepatic cirrhosis was made.

The autopsy was performed eight hours after death on a warm day in June. The anatomical diagnosis was: Old adhesions between liver, stomach, spleen and pancreas. Large hepatic gumma. Syphilitic ulcer of the stomach with perforation. Acute diffuse, sero-fibrinous and gaseous peritonitis. The peritonitis, it may be remarked, was caused by a mixture of the *Bacillus aerogenes capsulatus*, the *Bacillus coli communis*, and the streptococcus, the first organism predominating.

The omentum was greatly shortened, the small intestine contracted, and the general serous surface was thickened. The loops of the jejunum and ileum were particularly firm and rigid. The spleen was much enlarged, measuring 12x17x6 centimeters, capsule opaque and cartilaginous. No gummata. It was bound firmly to the fundus of the stomach, and covered by the very closely adherent omentum. The latter structure contained little fat, appeared as a mass of tatters, and was gathered together at the left border of the stomach, with which organ and the spleen it was firmly united. In gently separating the adhesions in this region, the stomach contents were seen to issue from a small opening in this organ. They agreed with the material found in the peritoneal cavity when it was first opened. The wall of the stomach in this situation was firm and board-like, and on being dissected away from the spleen was found thickened out of all proportion to the rest of the organ. The perforation had taken place below the splenic adhesion and at a point uncovered by complete omentum.

On opening the much contracted stomach, the general mucous membrane presented a mammillated appearance; but in the fundus, four centimeters from the œsophageal opening and occupying the greater curvature, a large ulcer measuring 5x5 centimeters was found. The base of this over most of the central part was the muscularis; the edges were thick, polypoid and firm, and the perforation was 15x3 millimeters in size. Just above the perforation the tissues presented a greenish and necrotic appearance.

The liver was bound to the diaphragm, its capsule was thick and cartilaginous. The left lobe was reduced to a mere appendage, but it was firm and nodular. The right lobe was not especially reduced in size. One section of the organ, the remnant of the left lobe was occupied by a mass formed by the confluence of several gummatous nodules, and the mass extended well into the right lobe along its lower border. The tumor thus formed lay over the portal vein, which was thick and white in color as it entered the porta of the liver, and passed upward to the summit of the liver between the lobes and impinged on the vena cava. The dimensions of the tumor were 11x4x5 centimeters. The gummata were of perfectly characteristic appearance and, on histological examination, presented the usual structure. Gummata were not found in other organs.

The comment made in the original report seems suitable at this time. It was as follows:[4] "The clinical cause of the disease is made clear by the autopsy findings. The splenic tumor and ascites were the results of the portal obstruction; the obstructing agent was the syphilitic gumma. It seems reasonable to suppose that the gumma was larger at one time than it was at the autopsy, and that the reduction of ascites was due to this change. The evidence for this might be found in the size of the left lobe of the liver, and is strengthened by the absence of a marked collateral circulation."

The outlook for syphilitic interstitial hepatitis is less favorable than the preceding, although, if the condition is not advanced, it is more favorable than non-syphilitic cirrhosis (Neumann). When the cirrhosis is advanced, the liver considerably dimin-

ished in size, and stomach and intestinal complications are marked, the prognosis is grave. Similarly, the existence of amyloid disease is, of course, to be considered of serious import, and yet instances have been recorded in which both advanced sclerosis and moderate (?) amyloid disease have yielded to treatment. If by this is meant return of the diseased organ to a state approaching the normal, and not merely the relief of certain symptoms along with the arrest of the pathological condition, the pathologist who has learned to regard fibrous tissue as a permanent structure and amyloid as absorbable with great difficulty, may be pardoned his astonishment and, perhaps, incredulity. Instances of recovery under these conditions have been mentioned by Grainger Stewart, Chovstek and Hérard.

The question of relative frequency of types of the disease seems not to have been considered by most writers. The statistics obtained from the Philadelphia Hospital indicate that the interstitial disease makes up one-half of the cases. Just here we meet with a great difficulty in that the pathological anatomy of this form of supposed hepatic syphilis does not differ essentially from that of ordinary cirrhosis, and the criteria for the determination of the nature of a diffuse cirrhosis in adults are not always easy to obtain or reliable when secured. The character of persons who seek a large public hospital and almshouse always suggests the probability of exposure to other poisons—alcohol in particular—in addition to the luetic virus. But that a part of the cases of generalized cirrhosis were certainly syphilitic is proved by the association of gummata in nine instances. The next lesion of greatest frequency is the gumma without marked cirrhosis, with amyloid degeneration was encountered least often.

The stage of infection to which the hepatic lesions belong has been discussed widely. Certain transient disturbances of the liver—*e. g.*, jaundice—belong to the secondary period, and Dittrich and Gubler believe they have shown that cicatrices may also appear during this stage. Frerichs, in his work on the *Diseases of the Liver*, states that he has never observed such lesions which could with perfect certainty be referred to the secondary period. The profound lesions of hepatic syphilis will be found in association with symptoms of the tertiary stage; and while it is highly probable that the general cirrhosis appears at that time, the gummatous nodules and amyloid must belong to that period.

We are uninformed of the factors that determine the situation of the focal lesions. Virchow, basing his views upon the position of the cicatrices, is inclined to regard mechanical injuries, such

as contusions, traction of ligaments, etc., as co-operating in causing localization. This view is hypothetical, but not without the bounds of possibility.

1. Quoted from Frerich's Diseases of the Liver.
2. Prager Vierteljahrschrift, 1849, p. 1; 1850, p. 33.
3. Transactions of the Association of American Physicians, 1898, Vol. xiii, p. 102.
4. Loc. Cit.

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# X. SYMPOSIUM ON DISEASES OF THE LIVER

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## 6. Tumors of the Liver

By GEORGE RYERSON FOWLER, M. D.
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Neoplasms of the liver occurring as primary growths are very uncommon. They may spring from the epithelial structure, adenomata and carcinomata representing this type, or from the connective tissue, as represented by fibromata, fibro-neuromata, and sarcomata. Secondary carcinoma follows a primary growth in the stomach in about twenty-five per cent. of the cases.

*Echinococcus Cysts.*—The embryo of the tenia echinococcus gains access to the various organs of the body by means of the chyle through the thoracic duct and vascular system. The liver is particularly predisposed to the parasitic development, the embryo gaining access through the portal vein, where it forms the most common tumor of the liver, with the exception of carcinoma.

In typical cases, a soft, fluctuating and insensitive tumor is found in the region of the liver, which rises and falls with the movements of the diaphragm, providing there are no adhesions to the abdominal wall. The so-called hydatid thrill of Santorini is a peculiar vibration supposed to be caused by movements of separate cysts (''daughter cysts'') within the firm capsule of connective tissue which encloses the cyst proper. It is elicited by striking the tumor with the finger-tips, the other hand being placed upon the tumor at a distance. It is not always present. Jaundice is not a common symptom, and is only present when compression of the bile-ducts occurs. The chief symptoms of echinococcus cyst are a feeling of weight in the region of the tumor, and, if the tumor is large, there is some interference with respiration, as well as digestive disturbances from pressure upon the stomach and intestines. These cysts may reach enormous proportions and rupture occur. The rupture of the cyst may take place in the stomach or intestine, thus leading to a spon-

taneous cure. Rupture into the blood or lymph vessels may take place, particularly into the vena cava, and prove immediately fatal. Rupture into the peritoneal cavity may cause fatal peritonitis. If the patient survives this accident, an extensive development of cysts follows. Rupture into the pleura, lung, pericardium or mediastinum, as well as accidental microbic infection, with resulting suppuration and sloughing of the sac, are events fraught with danger which occur in the clinical history of these cysts. Bile may enter the cyst and render it sterile by destroying the parasite, thus producing a spontaneous cure in time.

The diagnosis of echinococcus cyst of the liver may be determined by an exploratory puncture. A clear fluid, either neutral or alkaline in reaction, free from albumin and rich in sodium chloride, and containing succinic acid, is obtained. Microscopical examination sometimes reveals the knob-like heads, or scolices, and hooklets of the parasite in large quantities.

The treatment of echinococcus cyst of the liver is of an operative character, and consists in excision by partial hepatectomy, whenever feasible, by either the abdominal or transpleural route. R. S. Fowler operated at one sitting, carefully emptying the cyst by aspiration after exposing it, and then after isolation of the liver by large gauze pads, removing the cyst-wall and a thin slice of the adjacent liver substance by means of the thermocautery. Five cases operated upon by this method in my hospital services have all recovered promptly.

In large tumors with many adhesions, this radical procedure may not be practicable, in which case the fibrous capsule may be sewn to the edges of the abdominal incision, and the operation completed by opening the sac at once, or the latter may be postponed for three or four days. The cyst-wall may be removed in part or entirely; it frequently sloughs away, and may be removed piecemeal at subsequent dressings. In cases in which the cyst is too adherent for removal, final obliteration may be brought about by injections of diluted tincture of iodine (one to eight). Aspiration of echinococcus cysts and injections of various solutions, or leaving a cannula *in situ* for permanent drainage, are not justifiable procedures.

*Simple or Non-Parasitic Cysts of the Liver.*—These are of very rare occurrence. Probably a majority of those reported have been sterile hydatid cysts. Those not belonging in this category probably have their origin in dilated lymph-vessels. An exploratory puncture will readily settle the differential diagnosis between echinococcus disease and simple serous cyst, the presence of albumin and the absence of hooklets constituting the characteristic features. The treatment consists of evacuation of the

contents of the cyst after drawing the latter through an abdominal incision made over the more prominent portion of the tumor, and suturing the edges of the opening in the cyst to the margins of the abdominal wound, thus establishing permanent drainage. Large cysts that are free from adhesions may be, to a large extent, extirpated, any remaining portions being attached to the abdominal wall.

*Multilocular Cystic Disease.*—This is a condition similiar to multilocular cystic disease of the kidneys, with which it has been found to be associated. It occurs almost exclusively in elderly persons, or those over sixty. It is of but slight surgical importance, save from the standpoint of differential diagnosis, since the involvement of the entire liver precludes operative interference. It is a very rare pathological condition. In almost all the recorded instances the diagnosis has been made post mortem.

*Cystic Adenomata of the Liver.*—These arise either from the epithelial cells of the liver or the intrahepatic bile channels. One or more cysts may be present. König and Schmidt have each recorded a successful case in which a cystic adenoma of the liver was removed by operation. To these I have to add a third, from my own experience, the tumor, the size of an English walnut, appearing prominently in the epigastrium. A median incision was made, the tumor exposed and removed, together with a portion of the surrounding liver substance, by means of the thermocautery. The patient, at the end of three years, has not suffered from a return of the growth.

*Dermoid Cysts of the Liver.*—As an isolated affection, these are unknown. In the case described by Hulke, the dermoid tumors of the liver occurred in association with dermoid tumors of both ovaries. It would scarcely seem warranted to assert that the tumors of the liver were secondary to those of the ovaries. The discovery of a dermoid cyst of the liver in the course of a laparotomy, for it is probable that only in this way a diagnosis would be established, should be followed by a dissection of the entire tumor from the hepatic tissue. If this is found to be impracticable the same course may be pursued as recommended in large and adherent echinococcus cysts, namely, evacuation and suturing of the edges of the incision to the margins of the abdominal wound. Cases in which suppurative changes have taken place should be treated as abscesses of the liver.

*Angioma* of the liver occurs as a localized tumor of variable size situated beneath the capsule of Glisson, and consisting of diseased blood-vessels. The disease is of but slight surgical importance. Growths that are of congenital origin soon destroy

the patient, while the acquired cases are innocent in character and do not demand treatment, although Eiselberg removed such a growth from the right lobe of the liver by means of the thermocautery.

*Fribromata* and *adenomata* of the liver are of interest surgically principally for the reason that growths of this kind are the foundation for primary sarcoma and carcinoma of the liver. The probability of this serves to emphasize the importance of definitely exploring and broadly extirpating any tumor of the liver springing from either the epithelial or connective tissue structure in as early a stage of its development as possible.

*Botyroid Liver*, so called from its resemblance to a bunch of grapes, is a condition which is the final result of a syphilitic hepatitis. The changes in the liver are permanent and possess no surgical interest.

*Accessory Lobes.*—Occasionally these may become sufficiently hypertrophied to be mistaken for new growths. Keen attributes such a case to Martin, of Birmingham, in which the growth was supposed to be a renal cyst, until an abdominal section revealed its true character. The base of the lobe was ligated and the gall-bladder removed with the mass. Recovery followed.

*Syphilitic Gummata* may break down and find their way to the surface, thus simulating a neoplasm of the liver. These should not be made the subjects of operative attacks, unless the administration of potassium iodide has failed to ameliorate whatever symptoms they may produce.

It is customary to consider *floating* or *movable liver* in connection with tumors of the liver. This condition is either congenital or acquired. In the latter event it is due to tight lacing, or to dragging upon the organ by an enlarged gall-bladder, or it may be secondary to large tumors. In lacing liver, the constricted portion becomes movable. The congenital variety is usually associated with enteroptosis. The mobility depends upon the lengthening of the suspensory, lateral and coronary ligaments; in rare instances the latter are absent. It occurs much more frequently in woman than in men. In extreme degrees of mobility there is more or less continuous distress and exacerbations of severe pain; jaundice may be present at times. Digestive disturbances are common. Examination discloses a movable tumor the size and shape of the liver and resonance in the hepatic region. In lacing liver, the constricted lobes may be united by suture, as suggested by Billroth, followed by Hacker, Fecherning, and others. In a case of congenital origin, which came under my care over two years ago, the patient then being twenty years of age, an excellent result was obtained and main-

tained by fixation to the diaphragm and the sheath of the right rectus muscle through the medium of the broad surfaces of the greatly lengthened suspensory ligament. Kangaroo tendon sutures were employed.

### Discussion

Dr. Joseph D. Bryant, of New York: I do not now recall a better way of estimating the importance of removing the gall-bladder than by considering the part that it plays in the human economy, and the modifications of its function, dependent on the effects of disease, plus the special evils due to the disease changes themselves. The function of this organ appears to be that of an animated receptacle for bile, which at the proper time, *i. e.*, when the mucous membrane of the duodenum is stimulated by the presence of bile-needing chyme and meets the physiological demand by means of the reflex contractions, which cease when the duodenum is emptied. It seems that the peptones and proteoses are the needful stimulating elements. At all events, apparently the acids, the alkalies and the starch products do not excite the flow. Therefore, those creatures whose food products are akin to the latter class of substances, need not require a gall-bladder, and it does appear that the ass, horse, elephant and rhinoceros do not; but those creatures of different diet, as reptiles and nearly all fishes, do have gall-bladders. By the same token a man deprived of his gall-bladder ought to subsist on those substances whose partly digested products do not excite the organ's contraction in the normal state. The foregoing facts are no doubt more curious and novel than practical. However this may be, the fact remains that loss of physical capacity and of comfort, due to non-malignant disease of the gall-bladder, are usually promptly remedied by the removal of the offending organ, and this, notwithstanding the sacrifice of its physiological functions, and the health remains unimpaired so far as this organ is concerned, for an indefinite time.

The final death rate from the complications and sequels of the conditions now recognized as amenable to the operation of cholecystectomy is a matter of decided importance, to say nothing of the annoying sequels of cholecystostomy and cholecystendysis, which in many instances require the practice of cholecystectomy for prevention and cure. In the former category may be mentioned the various infective processes of the gall-bladder and its ducts; also those of the hepatic ducts themselves; cholæmia, with its special lethal predispositions and contributions to surgical disaster needs no mention at this time. These are the startling examples of the dangers, and others of importance are close at hand. In the latter category we find sinus formation, malignant development, recurrent cholelithiasis, with, perhaps, all of its former inflictions before us.

While it is true that the removal of the mucous membrane in cholecystostomy, as practiced by Mayo, may prevent the sinus sequels, yet it does not obviate altogether the danger of malignant development, which is said by Schroeder to take place in the biliary passages in fourteen per cent. of all gall-stone patients. Naunyn believes that half of the cases of chronic

jaundice diagnosticated as dependent on cholelithiasis are due in part or whole to obstruction from cancer of the biliary passages.

The mortality rate of cholecystectomy is a sufficient one, varying from three to twenty-five per cent. In 263 cases, forty-nine (14+ per cent.) succumbed, many of which (4 per cent. at least) from the unavoidable causes due to delay in operative practice. The technique of cholecystectomy is usually not difficult, and when practiced early in proper cases, the mortality outcome, in my opinion, will compare favorably with that of pelvic surgery for analogous conditions. There is one important point in connection with the technique of the operation. It is often difficult to get at the under surface of the liver, particularly if it be large, or if, for any reason, the chest be deep. Various methods have been suggested to facilitate the operation in such cases. I wish to suggest that if the hand be carried between the diaphragm and liver, the latter can be pressed firmly downward and fixed, and even tilted forward somewhat from behind, thus supporting the organ and exposing its bile ducts to better inspection and operative effort.

Dr. Robert H. M. Dawbarn, of New York: No allusion has been made to the valuable work of Mayo in this field of surgery. In the management of a class of cases in which the mortality has been enormous, it has been reduced to a very small percentage indeed by the methods which he introduced. When we have to deal with a calculus in the common duct, situated from one to two centimeters from its opening, the technique followed by McBurney is as follows: He enters the duodenum and stretches the duct until the stone is reached, and the latter is then milked out into the duodenum. When the stone is located higher up, a stout sewing-needle, held by a forceps, is introduced into the duct and with the point of the needle the calculus is reduced to gravel and then washed out into the intestine by irrigations through the gall bladder. Mayo makes an incision parallel with the long axis of the gut, removes the stone and then sutures the duct. A single catgut suture is taken and to one end of it a strip of gauze for drainage is attached. The same needle that is passed through the gut should be also passed through the end of the strip of gauze, and in that way you make sure that the gauze is not displaced during the movements of respiration. This suggestion of Mayo's in the management of stones in the common bile duct is very important, namely, to make sure that the gauze shall not be moved away during the movements of respiration, he fastens it with a single catgut stitch, the same stitch that is passed through the edges of the wound through which the stone was removed. Dr. Mayo recently told me that he uses the Murphy button in work about the liver, excepting in cases of obstruction of the common bile duct from a tumor, but no longer in connection with gall-stone work.

# XI. GUNSHOT WOUNDS OF THE LIVER, WITH REPORT OF A CASE

By EDWARD W. MULLIGAN, M. D.
ROCHESTER

The case which I wish to describe is that of an Italian salt-miner, who, in a fit of despondency, due probably to homesickness, shot himself in the abdomen with a revolver. It seemed to me that the case might be interesting and worth recording for two reasons: first, because gunshot wounds of the liver are comparatively rare, and recovery from severe wounds especially so; and second, because it might serve as an extreme example—extreme in that liver wounds were formerly considered among the most dangerous of abdominal injuries,—of the great advances made during the last few years in abdominal surgery. This progress is well shown on a large scale in the difference in mortality rate from such wounds, between our war of the Rebellion on the one hand, and our late war with Spain and the present fighting in the Philippines on the other. Otis, in the *Medical and Surgical History of the Rebellion*, records fifty-nine cases of uncomplicated gunshot wounds of the liver, of which but twenty-five recovered, and one hundred and eleven complicated with other abdominal lesions, of which thirty-seven lived. Bad as these figures made the chances of recovery from such wounds, it is probable that many of the fatal cases were omitted from the records. Many died on the spot, and others were considered so hopeless that the cases were neither attended to, nor recorded.

Pirogoff, in his *Kriegs Chirurgie*, written in 1864, said that wounds of the liver were in his experience always fatal. Even as late as 1887, the prognosis for any but the slightest wounds of the liver was hopeless. At this time Edler collected records of 543 cases, and of these nearly sixty-seven per cent. were fatal. And in this series also, many deaths went unrecorded, only the more favorable cases being taken—those which apparently had a fighting chance. Edler's figures show that of the three kinds of wounds to which the liver is subject — ruptures, gunshot wounds and cuts—ruptures are by far the most serious, the percentage of fatal cases being 85.7. Incised wounds come next, with 64.6 per cent., and gunshot wounds last, with fifty-five per cent. This represented the best practice of the early '80's, and, as in other instances, included only the most favorable cases, or those which had some special point of interest.

The attitude of the surgery of this period, toward such wounds, was well illustrated in the discussion which arose in medical circles concerning the treatment of the unfortunate President Garfield. It will be remembered that until that final arbiter, the autopsy, had spoken, it was the prevailing opinion, among the President's medical advisers, that the bullet had passed through or into the liver. In an article by Dr. John H. Gardiner, on this case, it is stated that "a few weeks after President Garfield's death, there was a meeting of the most distinguished surgeons in New York, and the question of the President's wounds was discussed. A surgeon of world-wide reputation suggested, that in wounds of the abdomen it might be a good thing to open the cavity and do what might seem best to aid nature to repair the injuries. He added, that practically all these cases died anyhow, so that there was nothing to be lost by such an operation. The suggestion brought forth a storm of opposition from the other surgeons present. One of them said in reply: 'Sir, you ought to be ashamed, even to suggest such an operation. It is calculated to bring our profession into disgrace, for no one knows better than yourself that opening an abdominal cavity, under such circumstances, would be certain to hasten peritonitis, and the man who would perform such an operation for a gunshot wound of the abdomen would come very close to being classified as a murderer.'" Such was the extremely denunciatory language used by one of the best-known surgeons of but twenty years ago. So far has our practice advanced in this short double decade that to-day, under similar conditions, it would be murder *not* to operate.

Concerning the modern handling of liver wounds, a thorough exposition is that of Schlatter in the *Beitrage zur Klinischen Chirurgie*, Vol. 15, Part Second. He calls attention to the remarkable insight of Theden, who, as long ago as 1795, recognized that wounds of the under surface of the liver were more dangerous than those of the convexity, on account of the large vessels and ducts there to be found, and who also stated that hemorrhage and the escape of quantities of bile were the chief dangers to be feared. Schlatter discusses three principal methods of handling injuries to the liver—the thermo-cautery, the tamponnade and suturing. The thermo-cautery is dismissed as neither trustworthy nor effective. In any case it is only suitable for slight wounds with only moderate hemorrhage, and even in such cases there is an ever-present danger of secondary hemorrhage. Of tamponnade, the opinion is expressed that it need only be resorted to when the substance of the liver is so friable that sutures fail to hold, or when a very large cavity is

left after the removal of a tumor. Burkhardt held that sutures in the liver substance were only effective for superficial wounds, but this opinion has been shown to be erroneous both by Langenbuch and Schlatter. The former, in one case, carried his sutures clear through the right lobe and fastened them to the costal cartilage. Hochenegg used still another method with good results. After removing a large tumor, he brought the lips of the liver wound in apposition and held them by sausage-shaped rolls of gauze, which were themselves held in position by mattress sutures—the abdominal wound, of course, being left open, and the case treated extra-peritoneally. Another variation is that of Von Bergman, who used silk sutures and carried them around small rolls of gauze to prevent them from cutting through. Schlatter reported five cases of his own—one stab wound, two gunshot wounds and two ruptures. Of the two gunshot wounds, one was from a revolver, as in my own case, and there was considerable hemorrhage to control, for which he used heavy catgut and carried the sutures deep into the liver substance. This checked the bleeding, and the patient made a good recovery. The other case was that of a boy of seventeen years, and the wound was from the projectile of a Flobert rifle. The liver tissue was very friable, but six silk sutures stopped the bleeding. The boy, however, died eight hours after the operation. The sutures were found to have cut through considerably. The conclusion, which may be drawn from the published cases, is that when the wound is of sufficient extent to require them, deep sutures of heavy catgut and superficial ones of silk will, in all but the most friable livers, suffice to effectively arrest the hemorrhage.

As to the best place to incise the abdominal wall, only the most general considerations hold. In the nature of the case it must largely be determined by the site and character of the wound. To reach the left lobe an incision in the median line may suffice. For the right lobe, a cut curved along the lower border of the costal cartilages and to the right of the rectus gives a good field for operating. The whole convexity of the liver may be laid bare by a method devised by Lannelongue. Its success depends upon the anatomical observation that the thoracic wall may be resected along the eighth, ninth, tenth and eleventh costal cartilages without coming upon the pleura, which connects with the chest wall higher up. Lannelongue begins his incision three centimeters from the border of the sternum, and continues it along a line two centimeters above and parallel to the thoracic border, ending at the articulation of the tenth rib and its costal cartilage. Retracting the tissues and freeing

the muscles from their attachments, he cuts through with cartilage scissors. On pushing back the severed cartilages, the whole convexity of the liver becomes accessible.

In my own case, three separate incisions seemed advisable, two for the purpose of gaining access to the parts involved, and one, low down, for drainage.

The patient was an Italian laborer, twenty-eight years old, married, had been employed as a salt-miner at Retsof. His attempt on his own life had been made at one o'clock in the afternoon and the wound had been inflicted with a 32-calibre revolver, held almost in contact with his abdomen. The fact of the shooting was discovered almost immediately, and a temporary local dressing applied. He was brought by train from Retsof to the Rochester City Hospital at 7:45 in the evening of the same day. On examination, it was seen that although apparently naturally robust, the patient was in a much exhausted condition — pulse 110 and weak, temperature subnormal. The abdomen was much distended, rigid and painful. The external wound was found to be one inch directly below the ensiform cartilage, and the skin at the wound margin was dirty and burned by the powder. There was no bleeding externally. On account of the patient's exhausted condition, he was stimulated and then prepared for immediate operation. About six and a half hours intervened between the shooting and the operation. The abdomen was opened in the median line, the incision including the wound of entrance. This permitted an investigation as to the further progress of the bullet, and it was found that the gut had escaped uninjured, as had all the other viscera except the liver. The entrance wound in the liver was seen to be a remarkably clean transverse cut, which looked as though it might have been made with a sharp knife. After passing through both lobes of the liver, the missile made an exit wound of an entirely different character, with edges very ragged indeed, and profusely bleeding. Passing from the liver the bullet had fractured the tenth rib, and lodged in the muscles of the back, where it could be felt with the finger, from the inside. Cutting down upon this from the outside, at a point about a hand's breadth from spine and over the tenth rib, I succeeded in removing the bullet and some pieces of bone from the fractured rib with bullet forceps. The entrance wound in the liver was so small and clean cut as to require no attention, but the bleeding from the wound of exit was and had been profuse, there being at the time more than a pint of blood in the abdominal cavity. I succeeded in stopping further flow by packing the posterior opening with a large quantity of sterile gauze, three yards of two-inch bandage being required. A third incision for drainage was made in the right flank, and a gauze-wound drainage tube inserted. After removing most of the blood from the abdominal cavity, the anterior incision in the median line was closed with through-and-through silkworm gut sutures. No bile appeared in the wound at any time. The temperature remained nearly normal throughout. The patient made a good recovery, leaving the hospital in little more than a month after his frustrated attempt at self-destruction.

# XII. AN UNUSUAL CASE OF ABSCESS OF THE LIVER

By EDGAR A. VANDER VEER, M. D.
ALBANY

Abscesses of the liver are due to the entrance of pyogenic bacteria or amœbæ coli, rarely of actinomyces or coccidia, and very seldom of a chemical agent. The causative material may enter directly by means of a wound or by the blood vessels or the bile ducts. Abscesses of the liver of vascular origin may result as well from thrombosis as from embolism, the infecting thrombus being directly continued from the inflammatory or ulcerative process in the radicles of the portal vein or from the umbilical vein into the liver.

It is probable that abscesses occurring in the tropics are due to the causes above mentioned, *i. e.*, amœbæ coli, and their frequency may be accounted for by the prevalence of amœbic dysentery in that climate, especially since Hartulis, Councilman and others have shown the relation of the amœbæ coli to dysentery and abscesses of the liver. Likewise Kiener and Kelsek have shown that dysentery was present with hepatic abscess in eighty-five per cent. of 314 cases. In carefully examining any series of cases of tropical abscess of the liver we cannot fail to be impressed with the frequency with which dysentery is mentioned.

Up to within the past year or two most of our knowledge of tropical abscess of the liver has been derived from India, and looking at the records of these cases quite impartially it is evident that the question of dysentery, in some way or other, appears very frequently. Now that our own army has had three years in the Philippines, we ought to have some very interesting papers and statistics on the connection between dysentery of amœbic origin followed by abscess of the liver.

The following case is reported, not so much because it is thought to be a case of amœbic abscess of the liver, following amœbic dysentery, as from the rarity of the locality where it pointed and was opened. The case was originally diagnosed as empyema and was so treated until ten days after the operation, when the dressings were saturated with a profuse discharge of bile, which continued until the sinus closed.

The history of the case is as follows:

*Mr. F. M.*, born May 25, 1878; native of the United States; clerk by occupation; has had none of the usual diseases of childhood.

*Family history.* Father, aet, 56, died very suddenly in October, 1901. No autopsy, but death thought to be the result of asthma. Previously always well, although much troubled with a cough. Mother died in 1889, age not known. Supposed always to have been in good health. Patient has no brothers; one sister, who died in infancy.

*Present illness.* Enlisted in U. S. Artillery, April 25, 1898. Was sent to New York, and from there to Tampa, arriving in August, 1898. Remained in Tampa one month, when yellow fever broke out, and he was returned to Fort Totten, New York Harbor. While in Tampa was troubled some with headache. Remained in different ports in New York Harbor until mustered out of service in February, 1899. He returned to work in a grocery store, and remained until he re-enlisted, July 18, 1899. Joined the 26th U. S. Volunteer Infantry, and was sent to Plattsburgh. Left there September 5th for San Francisco, via Boston and Providence. Arrived at San Francisco September 17th, was quartered at the Presidio, remained there eight days, and on September 25th sailed for the Philippines. Stopped at Honolulu, and arrived at the Island of Pinay October 27, 1899, remaining until November 11th, 1900. Had an attack of dengue, and remained in quarters for five days.

About five months after reaching the Island of Pinay, he was seized with a sudden attack of acute dysentery, which kept him in the hospital for about a month. At one time he had from twenty to thirty passages a day. The dysentery gradually grew better, but he never had less than from five to ten passages a day. He returned, however, to light duty at the end of six weeks, sailed for Manila November 11th, reached there November 25th, and remained until November 28th, 1900. Was then sent home as a convalescent from dysentery. Went on board vessel November 28th, sailed December 1st, and reached San Francisco December 31st, 1900. Dysentery continued the same. Was in the 3rd Artillery quarters until January 8th, 1901, when he was discharged. Patient came directly to Albany, reaching here January 15th, and at that time he had about seven passages a day. Diarrhœa continued the same until March, when it grew better, and he went to work in West Albany Car Shops. Worked there until May 25th, when the trouble began again. Was his own physician until October 8th, when he entered the County Hospital, at this time generally having from eleven to twelve watery passages daily. In the middle of July he first noticed a pain in the right side. The side gradually enlarged, and breathing became more difficult until he entered the hospital. Had loss of appetite; stated he had been unable to locate cause of dysentery. At one time thirty-five men of his company were in the hospital for the same trouble. The dysentery seemed to come on suddenly, and the disease at the time was prevalent in the town of Haro, Island of Pinay. Patient stated that about one-fourth of the men who had dysentery developed abscess of the liver. His stools were examined, and attending physicians said found full of germs—probably amœbæ.

I am indebted to Dr. W. G. Lewi for the following facts, obtained after patient's entrance to the County Hospital, October 8, 1901:

Upon admission, patient complained of pain in right side, which had lasted for six months. There were some cough and dyspnœa. Upon exam-

ination there was a distinct bulging on the right side of four or five inches or more. Percussion revealed flatness of whole right side below the fourth rib, and dullness above that. Respiratory sounds very indistinct; left side also dull. Breathing very bad; had chills and sweats, which ceased and then reappeared again. At the end of twenty-four hours he was aspirated by Dr. Lewi, the needle being introduced between the sixth and seventh ribs, one-half inch to the front of the axillary line. About three and one-half pints of a chocolate-colored fluid were withdrawn. Upon introducing the trocar, there was a very jerky feeling almost as if solid tissue were giving away. Unfortunately, no pathological report upon the fluid was obtained. Neither was there a record kept of the pulse and temperature. The patient was transferred to the Albany Hospital October 16th, 1901, and operated upon October 19th.

The following is a report of the operation: Curvilinear incision over the seventh rib. Portions of the seventh and eighth ribs were resected when about 1,000 cubic centimeters of a dark, brownish-looking pus escaped. Cavity curetted out with a blunt douche curette, using boric acid solution. Large quantities of thick, cream-like membrane removed. For drainage one towel and three vaginal iodoform gauze tampons were used; ends of wound closed with catgut sutures.

The report from the Bender Laboratory in regard to the specimen of fluid is as follows: The pus contains polynuclear leucocytes and desquamated epithelial cells, but no distinct micro-organisms can be made out. No tubercle bacilli were found. Cultures were negative after seventy-six hours in the thermostat. The pus is probably due either to tuberculosis or to a pneumococcus infection, the pneumococcus having died out.

The patient's temperature immediately dropped to ninety-six after the operation, his pulse to eighty, and he was very weak. However, he rallied from the shock of the operation in about twelve hours, and after that made a slow but uninterrupted recovery. For the first week the wound discharged the dark, brown-looking pus, but after that the discharge was almost a pure bile. At the same time his dysentery, which had almost ceased for a period, returned, and finally was only checked with the greatest difficulty.

The following are the only cases similar to this one that I have been able to find reported in the literature upon this subject: Dr. E. W. Boughton reports a case in the London *Lancet* for August 22, 1901, of an hepatic abscess, implicating the pleura, lung, kidney and colon. In this article he describes the case of a man who first had an hepatic abscess, then an empyema of the right side, which was opened and a part of the sixth rib resected. After that an abscess of the lung formed, which finally healed. About a year after the patient also developed an abscess which discharged through the colon and right kidney. After all these troubles the man recovered.

Dr. William P. Northrup reports a case in the *New York Medical Record,* February 2, 1884, of a man thirty-five years

of age, who had always been in the best of health, except for an occasional attack of gall-stones. May 13, 1883, he was seized with an attack which lasted about six weeks. At the end of that time an examination of the chest showed fluid on right side to the middle of the scapula; left lung normal. The chest was opened and upon puncturing the pleura there was a puff of most offensive gas, and at every effort of the patient to breathe a dash of fetid pus. Upon introducing, and passing the sound downward, the whole liver was found to be rotten with abscesses. A drainage tube was inserted and free drainage established. The amount of pus during, and just after the operation, is established at four quarts. The patient made a tedious but good recovery.

In the London *Lancet* for December 4 and 11, 1897, is an excellent article on "Tropical Abscess of the Liver," by C. W. Windsor, M. D. In this article he reports a series of fifty-eight cases of tropical abscess of the liver occurring at the Dreadnought Seaman's Hospital, only four of which terminated by opening into the right pleura.

The favorite seat of opening of a liver abscess seems to be the right lung, the pus being coughed up and expectorated through the bronchi. Abscess of the liver has also been known to empty into the left lung, right pericardium, frequently into the abdominal cavity, and Dr. Flexner even reports two cases which opened into the inferior vena cava.

In the case which I have just reported it seems fair to assume that the abscess opened into the right pleural cavity, inasmuch that as soon as it was opened the lung resumed its normal function, and that at no time did the patient expectorate any blood or pus, which would have been the case had the abscess been in the lung.

# XIII. SYMPOSIUM ON GENERAL PARALYSIS OR PARESIS

## 1. Etiology of Paresis

By ARTHUR W. HURD, A. M., M. D.
BUFFALO

Dementia paralytica, or paresis, has been recognized and studied for about one hundred years, but it is probable that only during the past fifty years has it received that sort of investigation which familiarity with the disease, accuracy of diagnosis and the accumulation of a sufficient number of cases for reliable statistical purposes would lead us to regard as of real scientific value.

A careful analysis of the histories of paretics during the last half-century has limited the assigned causes of the disease to a comparatively small number on which all observers are practically agreed, but with wide divergence as to the relative importance to be given to the several factors. These are syphilis (acquired), alcohol, mental stress and worry, heredity (including inherited syphilis) cerebral traumatism, sunstroke and lead poisoning.

That a history of syphilis is present in a large number of patients is established, but it is doubtful whether we are yet in a position to subscribe to the dictum "no syphilis, no paresis." Krafft-Ebing has included another factor in his euphemistic and alliterative phrase "Civilization and syphilization." The statistics of different authors vary widely. Thus sixty-four observers found a history of marks of syphilis in paretics in percentages varying from eleven to ninety-four per cent., as collected by Peterson, Mott, Hirschl and others.

In the cases of paresis coming under my observation for the past ten years a percentage of twenty was found, but this is undoubtedly far too low, for there are many elements in hospital practice which tend to render it impossible to obtain reliable histories. For instance, many of our patients, because of their mental condition, are unable to give a history, whereas it might have been obtained earlier in the disease, before they had reached that state of mental aberration which led to their commitment to a hospital. Again, from the nature of the case, such a history is frequently not obtainable from friends, sometimes because they are honestly ignorant of the previous exist-

ence of a disease so usually concealed, while at other times, even when they are cognizant of it, from motives of pride or delicacy, they persist in concealing the fact. Moreover, not a few of the patients come from walks of life many of whose members, through ignorance or inattention, never recognize the infection, or attach no importance to it. Or it may happen that they have dismissed it from their minds because they were told by some physician that they were cured. Finally, a large number of those that are too demented to give a history themselves have been depraved and wanderers so long that they have no friends who could enlighten us.

Taking all these factors into consideration, among them that in European countries (older than ours) the percentages seem higher, it is probable that at least sixty per cent. of paretics have suffered in former years from syphilis. When we consider that this is about ten times the percentage of syphilis in insanity generally considered, the coincidence is truly startling, and we are forced to the conclusion that if not the direct cause lues is still a factor of such overwhelming preponderance as to occupy a most important relation to the disease. But, it has been urged that, granting sixty to seventy per cent. of paretics have a specific history, there still remain thirty to forty per cent, to be accounted for. There is undoubtedly a residue which must be assigned to other causes, but the foregoing statement has by no means the force that it might appear to have at first sight, inasmuch as it is found that, if one takes one hundred patients with specific lesions on the skin—not paretics or mental cases—sometimes a history of lues is obtainable in a no larger percentage than in the same number of cases of paresis. Thus, one observer in London in a Lock hospital found that eighty per cent. or less of skin cases gave a specific history—where, as he knew, all were syphilitic,—a percentage no higher than some have found in paresis. Hirschl, quoted by Krafft-Ebing, found (in the syphilitic ward of Professor Lange in Vienna) that out of sixty-three cases of the late forms of syphilis a certain history of specific infection was obtainable in only fifty-four per cent. and a probable history in 9.5 per cent., whereas in 36.5 per cent. in spite of the existing evidence of lesions, no history was obtained. As compared with these figures, another observer found among his paretics a luetic history undoubted in fifty-six per cent., probable in twenty-five per cent., and wanting in nineteen per cent. respectively. In this series of investigations it will, therefore, be seen that the histories in the cases of skin syphilis fell short of those obtainable in paretics by 17.5 per cent. Furthermore, a series of experiments was

attempted abroad which, it is needless to say, could not be carried out in this country, by which nine undoubted cases of paresis with no obtainable history of syphilis were all inoculated with syphilitic virus and kept under careful observation. Not one of these developed syphilis. The most obvious inference from this is that notwithstanding the absence of history all had previously suffered from the disease and were therefore immune.

Dr. Mott has pointed out, among certain other considerations worthy of notice: first, that in Iceland, where syphilis is unknown, paresis is never encountered, and that the only case ever seen was in a syphilitic foreign sailor. Against this, however, it should be recorded that in Egypt and Japan, where syphilis is very common, paresis is very rare, but here again is to be noted the fact that there is very little mental stress and overexertion in fatalistic Egypt and in Japan. In these countries, civilization, with its rush and hurry, is of comparatively recent development,—of about twenty-five years perhaps,—introducing a new factor which we will consider later. Secondly, that the clergy, priests and Quakers, who are very rarely affected with syphilis, show a very great freedom from paresis.

In this connection Krafft-Ebing quotes from the Deggendorf Asylum report that out of 1,090 patients there were seventeen priests, not one of whom had paresis, whereas out of fifteen soldiers eight were paretics, a percentage of 61.5. He also says that Bouchaud, collecting statistics from France, records that of 288 priests admitted only nine, or three per cent., were cases of paresis. Krafft-Ebing himself reports that among 1,000 male paretics he found only one Catholic priest, and he had contracted syphilis while a student.

Again, he says that in rural districts, where syphilis and mental stress are both less prominent, paresis is correspondingly rare, and that both correspondingly increase on approach to the great cities. In the canton of Wallis in Switzerland, where syphilis is extremely rare, the percentage of paretics to the total number of male admissions to the asylum is only 1.1 per cent.

Mendel showed that in 1876 the percentage of paretics in an asylum of the agricultural provinces of Sleswick-Holstein and Hanover amounted to only 4.56 per cent., whereas in the urban institution of Brandenburg and in Berlin the percentages were 19.7 and 26 respectively.

In the rural portions of Ireland, where syphilis is very rare, paresis is almost unknown, and the same is recorded by Hougberg as regards Finland. In one institution in each country the paretics amounted to only 7.03 per cent. of the total number of admissions, and as regards sex the proportion showed eleven

men to one woman. Krafft-Ebing also quotes Hougberg as reporting, that of 107 paretics admitted between 1875 and 1892 there was not a single man from the country, whereas city laborers afforded numerous instances. Arnaud, in the *Annales med. psychol.* for 1888, wrote that in the large cities of France paresis was four times more frequent than in the country districts. Blaschko's Danish researches prove that the same proportion exists between the city and country in syphilis as in paresis; viz., about four to one.

Again, while syphilis affects all classes of men, it is rare among the upper classes of women. Paresis is likewise found in all classes of men, but rarely among the higher classes of women.

Furthermore, the relative frequency of syphilis in men and women is about the same as of paresis: viz., about four to one.

In Denmark, where an enumeration of those afflicted with venereal diseases is attempted, Blaschko states that the proportion of venereal diseases in men and women is 4.1 to 1, while Idanoff, collecting statistics regarding paresis, finds the proportion between the sexes to be 3.49 to 1.

I have not as yet spoken of the increase of the disease in modern times, but it is a striking fact that whereas a few years ago juvenile paresis was a great rarity, whole series of cases are now available for study. Alzheimer, in connection with his series of young paretics, obtained in ninety-one per cent. a history of a foregoing syphilis,—in the great majority hereditary. Fournier found one hundred per cent. of his thirty-seven cases syphilitic, the disease being mostly hereditary, more rarely acquired. Krafft-Ebing obtained a history of syphilis in eleven of his cases, while in twenty-two cases under Mott's observation thirteen were surely syphilitic, in four syphilis could not be excluded, while in the remaining four there was a history of the disease in the mother. Thus with specific signs on the body sixty per cent., or combined with a material history eighty per cent., had hereditary syphilis. Now, while we find (European statistics) that the proportion of paresis in adults is about four men to one woman, Mott noticed the striking fact that in his juvenile cases the sexes are about equal. This can only mean that where men have about four chances to one of acquiring syphilis, compared with women, children have equal chances of inheriting it,—a fact which would tend to sustain Mott's conviction that syphilis was the all-predominant factor. Direct heredity seemed to play but little part, for while three of the children had paretic fathers, two of those fathers had a history of early syphilis and had transmitted well marked signs of that

disease to their children, and it may well be inferred that their early lues had more to do with the development of paresis in their children than had their own dementia paralytica.

As regards heredity, however, it must be said that some observers give it a much greater prominence, not, perhaps, in the way of a direct transmission of the disease, but of the transmission of a neuropathic diathesis from any of the recognized forms of mental or nervous disease by providing a soil in which paresis may readily flourish. Paresis *per se*, so far as my experience goes, may justly be regarded as one of the least transmissible of mental diseases as compared with the functional psychoses which seem pre-eminently so.

Näcke, as quoted by Berkley, supports the view that an invalid brain is prone to develop paresis from acquired syphilis. Thus, in an investigation of one hundred paretics, he found fifty per cent. with certainty having a cerebral defect, and with probability a greater number. He holds that a defective brain with acquired syphilis is most frequently the foundation for the development of paresis, and that without the defective brain the specific infection would not have had this result. But it must be seen that the converse is also true,—that without syphilis the defective brain would not have developed paresis, a position of view consonant with that of those who hold syphilis to be the prime cause, but giving greater prominence, it is true, to the inherited favorable conditions.

As to the transmission of the disease in any sense *per se*, it seems probable that the consensus of opinion that heredity plays only a minor part, in the present state of our knowledge, is a safe conclusion. In my experience, the victims of paresis have not been feeble individuals, inheritors of disease, but are the active, the robust, the hale fellows, the free and generous livers.

Alcohol was formerly considered by French writers to be a very frequent cause of paresis. At present they have modified this view somewhat. Inebriety so often belongs to those who have syphilis; it is so often a feature in the lives of those undergoing great mental strain and anxiety; it is so often developed along with other irregularities by paretics in the first stage,—an effect rather than cause,—that it is difficult to assign to it a definite rôle. If no syphilitics were addicted to alcohol, and no alcoholics had syphilis, it would be an easy matter to determine which class furnished the paretics, but Venus and Bacchus have ever gone hand in hand, and to differentiate is difficult. Dr. Mickle, fifteen years ago, regarded alcohol as a cause in as high a percentage as 23.5 in men,—but at the present time I feel sure it would not be accorded so prominent a part. Alcoholism

produces disastrous results in human brains, it is true, but these results seem to be *sui generis* and somewhat distinctive—a false rather than a true paresis. That it is a factor and an adjunct, however, to other causes is most probable; that by itself it is efficient in a moderate number of cases seems quite possible; that it is an active aid to syphilis is most probable; that it is a not infrequent accompaniment is undoubted. Many specific cases, however, give no history of alcohol.

Injuries to the head are assigned in a small number of cases. In some there seems to be possibly no other element, and I am not prepared to deny that a severe cerebral injury may in itself be sufficient to cause the disease, although I am free to say that in the greater number of instances under my own personal observation, in which cerebral injury is said to have been the sole cause, by diligent inquiry, I have been able to find in almost every case a history of preceding syphilis. The paresis has sometimes developed so soon after the injury as to make the relatives sure that it was the sole cause, but with a latent specific history in almost all these cases I am inclined to think that trauma is simply the ripening element, bringing to the surface that which was ready to appear at any time. I am rather of the opinion that many of these cases would never have developed paresis from the blow, had it not been for the antecedent syphilis. Of the etiological significance of poisoning by lead, tobacco, etc., it can only be said that such effects must be put down as problematical. There is a small percentage of cases in which one or other of these have been held responsible in the absence of any other apparent cause. It is fair to say that while the influence of such poisons might be sufficient, the number of cases depending upon them is too small to constitute them important factors.

I have so far omitted any extended consideration of mental over-strain, worry, anxiety, but these seem to supply a somewhat essential element. Paresis has been called "the disease of the nineteenth century." It seems hard to believe that, with syphilis existing for thousands of years, we should not have had paresis recognized in earlier centuries, had it existed, by those good observers in medicine who always have been found, no matter what their times or enlightenment. If syphilis has been the sole cause, paresis must have prevailed earlier, and if so it must have been recognized and gotten into the literature. If we take the other alternative, and conclude that it did not exist to any such extent as now, we must see what distinguishes the nineteenth century from those that have preceded it.

The great contrast, it seems to me, lies in what must be termed

"civilization." An era of inventions, of electricity, of rapid means of communication, and of business competition, has called forth more and more mental exertion and struggle. This is a very trite remark and the point would not be referred to had it not a special bearing here. The increase of paresis with the progress of the century has been something remarkable, if we are to believe European authorities. Thus, in Deggendorf, a Bavarian institution, the number of paretics, which from 1869 to 1874 had amounted to 9.3 per cent. of men and 5.2 per cent. of women, showed in the years from 1885 to 1890 an increase to 23.2 per cent. of men and 9.3 per cent. of women. At Eichburg the number of paretics has been almost doubled. In some of the cities, particularly Berlin and Munich, still more remarkable percentages of increase have been noted. In this country, however, I have not been able to find such a rapid increase as Continental figures would indicate for Europe.

The great and increasing mental anxiety and over-exertion of this century seem, then, to offer the principal contrast with those which have preceded, and it seems fair to assume that these, combined with syphilis, may supply the exciting cause in the largest proportion of cases. Egypt has but little mental stress worry or anxiety; it is a country of fatalism; whatever is, is accepted; there is lacking the mental rush and over-exertion of Western Europe and America, and it is precisely in Western Europe and in America that paresis is most largely found.

As regards the subject of tabes, Sachs, quoted by Peterson, says, "The very frequent development of tabes after dementia paralytica, and of dementia paralytica after tabes, proves the close relationship between the two diseases; and since tabes is beyond doubt a form of syphilitic disease, there is sufficient ground for thinking that dementia paralytica has the same etiological imprint." To this objection is made that if the relationship is so close there should be a closer approximation as regards the percentages of specific histories obtainable in the two diseases. Thus, in tabes we find a history of syphilitic infection in eighty to ninety per cent. of the cases, whereas in paresis it is somewhat less frequent—in sixty per cent. on an average, for we have found the percentages varying from eleven to ninety per cent., according to the experience of the observers, the nationality of the patients, their social condition, and locality of residence.

This lack of approximation may be partly accounted for by the fact that the mental condition of tabetics often enables them to give a clear history of syphilis, which it is impossible to obtain in the mentally obscured paretic. Furthermore, while the

two diseases without doubt often develop one into the other, after all, according to my experience, the incidence of the two is not so frequent or so striking as to make the problem an insistent one for solution. When we consider that the brain is affected in one case, and in the other the cord,—different parts of one system it is true, but different nevertheless—and that other considerations may affect the possibility of accurate histories in paretics, we may feel that the cases are not exactly parallel and that the arguments on either side are somewhat inconclusive.

Again, it is urged that if paresis were the result of syphilis we should obtain the same beneficial effects from anti-specific remedies in paresis that we get in ordinary brain syphilis. This apparently is a very strong argument against the theory of a specific origin, and its consideration would lead us into the domain of pathology, a topic reserved for another paper, and for a pathologist. It may be said, however, if Mott's contention be true, that in paresis it is the neuron that is attacked, whereas in ordinary brain syphilis it is the meninges, especially of the base, and the arteries, with the formation of gummata, etc., we may have here the true explanation, for the neurons, as he demonstrates, are incapable of regeneration—according to the dictum of Virchow, who says: "A cell nourishes itself and is not nourished."—while the structures concerned in ordinary brain syphilis can be affected by treatment. In other words, according to Mott, it is simply a question of what structure is involved in the disease process, and not a question of the identity of the cause, that determines the effect of treatment. This brings to mind the query of Allan McLane Hamilton, who asks, "Are there any varying toxins in syphilis, some more active, which attack the skin and mucous membrane, and the like, and show immediate effects, and another toxin which has as yet eluded us, which lies dormant for many years until it finally shows itself in either disease of the brain or spinal cord?"

But whether syphilis acts directly as a cause of cerebral changes, producing what we call paresis, or indirectly by lowering vitality, preparing the way or predisposing, the result is practically the same, and we must admit that in one way or the other it is the most potent cause of paresis, but that there are other causes that must be recognized as acting as adjuncts.

It seems justifiable in the present state of our knowledge to conclude:

That syphilis is the most common factor in the production of paresis.

That it may cause it directly—an exciting cause.

That it may cause it indirectly by bringing about such a devitalization of the system generally as to render other influences operative—a predisposing cause.

That it is not usually the sole cause, but that there is associated with it the deleterious effect of mental stress and overexcitement, dissipation and alcoholism, and heredity.

That in a certain relatively small number of cases mental stress, worry or over-work may be the sole ascertainable cause.

That traumatism may also be the cause in a still smaller proportion of cases, but that in many of them it acts as a developing or ripening agent of an incipient paresis in a syphilitic subject.

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## XIV. SYMPOSIUM ON GENERAL PARALYSIS OR PARESIS

### 2. The Early Diagnosis of Paresis

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It is with much hesitation that I attempt to discuss so difficult a subject as the early recognition of paresis, for here we are confronted with borderland conditions and overlapping states. I know of no subject which is so important, and no subject concerning which error is more frequently made, both on account of the gradual invasion and also because of the generalized character of the symptoms. The recognition of the disease in the early stage is especially difficult because, in the average case, general disturbances for a long time precede the appearance of special symptoms indicative of organic change. In cases in which a satisfactory and detailed history of the very early period can be obtained, we usually receive an account of general ill-

health, an ill-health evidenced both by complaints on the part of the patient, as well as by the observations of his friends. As a rule, we find that the patient has not been well for some time, —usually months. If during this preliminary period of ill-health, the patient visit his physician, the case is not infrequently mistaken for one of neurasthenia, and yet when the symptoms presented are closely analyzed, it is found that they resemble those of neurasthenia only superficially. It is true we have quite commonly the symptom of ready fatigue, and in addition inability to maintain the attention for any length of time, upon affairs of business or other every-day matters. Notwithstanding, the typical fatigue syndrome of neurasthenia is wanting, as an analysis of the early symptoms will show. The friends of the patient often maintain that his appearance and manner have changed, that he no longer attends to his business as carefully, or no longer does his work as well as formerly. He may look somewhat tired or, perhaps, a little sleepy. At times he is pale and at times, again, his face may be unusually flushed; it often lacks its former vigor of expression. His attitude, his movements, his walk may suggest general loss of tone. Sometimes he is troubled with various vague distressing sensations about the head, such as fulness, pressure or constriction, or again he may complain of ringing in the ears, sparks before the eyes, and muscae volitantes. Attacks of giddiness and vertigo may also occur, and some patients suffer from a dazed or stunned feeling in the head. Occasionally there are rheumatoid pains, referred to the arms, legs and to the back of the neck or trunk. More often, when pain is present, it assumes a distinctly tabetic character, is lightning-like and darting, or now and then may suggest neuralgia. Pain in the head of great severity and simulating migraine is not very infrequent. At times the headache is referred to the supraorbital and adjacent regions, and especially to the eye-ball of one side, the attack then suggesting ophthalmic migraine.

In the neurasthenic patient, the symptoms are almost exclusively subjective. He begins by describing to us how he feels, and complains actively of various symptoms. He tells us that he is nervous, is easily excited and upset, that he gets very tired at his work, that his head aches, his heart palpitates, that he has indigestion, that his bowels are constipated. He complains of various diffuse aches or pains which suggest the sensations of simple or exaggerated fatigue. He suffers from occipital headache, from backache, from aching in the limbs and, perhaps, tenderness over the spine. He presents also quite characteristic signs of atony of digestion or of gastric catarrh and constipation;

and very commonly with a history of palpitation of the heart is associated that of coldness and dampness of the extremities.

While there are some superficial resemblances between the symptoms which he details and those found in the early beginning of paresis, we cannot help but note certain striking differences. First, the patient in the early beginning of paresis, if he appears before the physician at all, is generally brought by friends or relatives. Rarely does he come of his own initiative. Secondly, it is the friends or relatives who detail the symptoms. They give an account of changes which they have noted in the patient, and of which he himself may not be cognizant or to which he has paid no attention. The signs of ill-health are first observed by those about him, not by the patient himself, who, as a rule, does not actively complain, unless there are present tabetic or neuralgic pains or attacks of the migraine-like headache. His conduct is in marked contrast to that of the neurasthenic patient, who not only seeks the physician's advice himself, but also has at his tongue's end a long list of complaints with which we are all very familiar. Frequently he comes with memoranda written upon small pieces of paper. Further, the physical appearance of the neurasthenic is rarely changed, or in any case, is not altered in the same manner as is the appearance of the paretic. He may be pale, perhaps, or a trifle thin, but certainly he is not somnolent, and his features lack none of their accustomed force. Often the anxiety with regard to his condition causes an accentuation of the facial lines; certainly never an effacement of folds and wrinkles; his face may have an anxious or a worried look, but there is no change of quality in its expression. It is still the same face to friends or relatives. It has not become altered so as to suggest that the patient is a changed man. The friends are never the ones to first discover that the patient is ill, and indeed frequently listen to his complains with impatience and incredulity. No one has noted marked change either in his appearance or manner. Least of all does anyone tell us that the patient attends to his business less carefully or less well than formerly. Further, when we analyze the symptoms which are detailed by the neurasthenic, we find that they are those of chronic fatigue, of occipital headache, or backache, of limbache. There is no account of darting or lightning-like pains. The headache is quite characteristic, and there is no occurrence of one or two attacks of terrible neuralgia or migraine-like headache so often met with in the early paretic. Again, the motor phenomena of neurasthenia are those of simple weakness and ready fatigue. There is never a loss of precision in movement, never a loss of accuracy of co-

ordination. It is not observed, for instance, in the neurasthenic mechanic, that his work is done less accurately, or in the neurasthenic clerk or book-keeper that his hand-writing is changed. In the mechanic, in the early stage of paresis, inaccuracy and change in the quality of his work are among the first symptoms observed. Further, the deterioration is observed not by himself, but by those about him.

The sleep disturbances of neurasthenia are radically different from those of paresis. The neurasthenic, on going to bed, as a rule, falls asleep readily, but is disturbed at intervals during the night, or awakens early in the morning and leaves his bed in an exhausted and depressed condition. After he has taken food, and as the day progresses, his condition steadily improves until the evening, when he is in a relatively good condition. By this time his fatigue symptoms have largely disappeared, and many a neurasthenic patient in the evening is in such good condition that he himself will declare that he is no longer ill. In paresis, in the early stage, the opposite condition, as a rule, obtains. Though the patient may suffer from insomnia, dreams or disturbed sleep, he is usually at his best in the morning, but as the day progresses, becomes more and more drowsy until toward evening somnolence may be very marked. Vague and suggestive symptoms, absent in the morning, may be present in the evening and be so pronounced as to attract the attention of those about him. The speech, which may have been clear in the morning, may be distinctly thick and blurred in the evening. The face, which has had a relatively normal expression in the morning, may be dull and heavy in the evening; the gait and the gestures may be cumbrous and awkward. Slight disarrangement of the clothing, indifference to the niceties and proprieties, unwonted profanity, coarseness and irritability may also be noted at this time.

The neurasthenic is not only at his best in the evening, but qualitative mental changes are at no time present; in the paretic, on the other hand, qualitative mental changes, although possibly in very slight degree, are noticeable almost at the outset. The mental phenomena of the neurasthenic are essentially quantitative. We have first a marked and characteristic symptom in the diminution of the capacity for intellectual effort. The attempt to do mental work sooner or later brings on symptoms of exhaustion. The task may be properly begun, but soon the patient experiences difficulty in keeping the attention upon it, and if the attempt be persisted in, painful sensations about the head arise, such as a feeling of constriction, headache and giddiness. This difficulty of concentrating the attention may lead to an attitude of distraction and inattention. Mental

fatigue is also evidenced by a number of other symptoms. Ideas do not present themselves as readily or in the same rapid succession as in health. There is a distinct decrease in the spontaneity of thought, and this the patient himself well recognizes, often saying, "I cannot think." There may also be more or less marked irritability. Trifling occurrences sometimes provoke to anger; just as other inadequate causes, *e. g.*, a play at the theater, or a newspaper account of a murder, may excite the patient to laughter or to tears. Together with these symptoms we find that our patient is also introspective. He suffers from a distinct nosophobia. His indigestion suggests to him that he has serious organic disease of the stomach; his palpitation leads him to fear that he has serious disease of the heart. The patient so afflicted not infrequently comes to the physician with the statement that he is afraid he is "going out of his mind," that "he is losing his memory." Indeed, "loss of memory" is one of the most common phrases used by the neurasthenic. How incorrect his expression is, every one of my auditors can testify, for the neurasthenic patient will give a most circumstantial history of his case, not omitting even unimportant details, and will in other ways render it clear that there is no actual impairment of memory. Neither is there at any time any inability to properly understand or to correctly reason about ordinary matters. We are at once convinced that there is no qualitative mental change whatever.

The mental condition of the paretic presents in this respect a more or less marked contrast. In the early initial period of his disease, he, too, becomes readily fatigued; he cannot do his work without an unusual effort, and it soon becomes distasteful to him. There is added, however, to this symptom of ready fatigue, a distinct feebleness both in the ability to apprehend and in the ability to remember. Unusual forgetfulness is especially observed as regards the smaller details of life. Distinct and undoubted impairment of memory is one of the first symptoms. The patient's work becomes changed in quality, not only because of slight impairment of co-ordination of movement, but also because the patient forgets how to do it. In addition there are sooner or later those slight, but constantly recurring changes in habit and lapses in conduct which are so characteristic of paresis. These are all qualitative in character, and are indicative of a fundamental alteration in the mental make-up of the individual; the forgetfulness, manifested in neglect of the attire, in neglect of business, in infractions of a long accustomed daily routine, unseemly behavior at the table when eating, gradual obtusion to the proprieties of conduct, all have but one meaning.

This dulling of the sensibilities is further made evident by the slight impression which important events, such as a business transaction of consequence, the illness of a near relative or the death of a friend, make upon the patient. A tendency to repetition in conversation, the introduction of unrelated matter and an occasional obscene or profane expression on the part of a man previously precise and careful in his language, are but shadows of events to come. In the neurasthenic, it is unnecessary to point out, such changes as these never occur: the sense of propriety, the sense of duty, the sense of the æsthetic, never become blunted. There is none of that loss of interest in the family, none of that lack of affection for relatives or friends, none of the gross indifference of the paretic. If the neurasthenic cannot follow his daily vocation because of his ill-health, he is worried and distressed. He manifests no indifference to business, and least of all are there found errors or confusion in his accounts. There is none of the gradual rise to the surface of the coarser animal qualities, none of the excessive eating and drinking, none of the beginning indulgence in alcohol or unwonted sexual gratification, no diminution in the nicety and refinement of speech, none of the coarseness and vulgarity seen in the early paretic. No history is elicited of undue familiarity or improper jests with ladies, female servants or others.

In the paretic the mental changes are far more than those of mere weakness, while in the neurasthenic, they are simply and solely those of fatigue. Even when distinct psychopathic factors make their appearance in neurasthenia, they never in the least resemble those of paresis. We need only mention the special fears, the various phobias and obsessions to prove the truth of this assertion.

To my mind the difficulty of the distinction between neurasthenia and the very early stage of paresis is largely due to the loose conception of neurasthenia that prevails. The conception of neurasthenia should be strictly limited to that of the fatigue neurosis; the term neurasthenia should not be applied to any other condition, and to say that a paretic passes through a period of neurasthenia in the early stage of his paresis, is to make a gross misuse of terms. We must separate neurasthenia from certain other morbid states which, while they superficially resemble it, differ from it radically. Among these are especially the nervous conditions, which belong to the larvated, undeveloped or prodromal periods of the insanities. The various symptoms of nervous weakness and other nervous manifestations by which such affections are attended, bear no relation whatever to those of neurasthenia. They only superficially resemble the lat-

ter and they should be characterized not as neurasthenic, but as neurasthenoid. The term neurasthenic should be applied only to the symptoms of neurasthenia, and not to those of other and widely differing affections, and what is true here of the relation of neurasthenia to paresis, is also true of neurasthenia in relation to melancholia and other mental affections. It is just as incorrect to say that a patient has passed through a neurasthenia, which has deepened into a melancholia, as it is to say that a patient has passed through a neurasthenia which has deepened into a paresis. The truth is that such a patient has merely passed through a neurasthenoid stage: he has never been truly neurasthenic.

Paresis in the early portion of its initial period is every now and then confused not only with neurasthenia, but also with hypochondria and melancholia. From hypochondria it is readily distinguished by the same factors which differentiate it from neurasthenia. In simple hypochondria, notwithstanding the nosophobia, there are none of those manifold evidences of qualitative mental changes which are so evident in paresis. There is no mental obtusion, and the patient is in close relation with his environment and the facts of his daily life. The fact that many paretic patients are in their early history very hypochondriacal, emphasizes the importance of this differentiation.

Because the initial period of paresis is frequently accompanied not only by neurasthenoid or hypochondriacal symptoms, but also by marked mental depression, the error is not infrequently made of confounding early paresis with true melancholia. Melancholia we now know to be a symptom-complex of a more extensive affection, namely, melancholia-mania. The latter is a disease largely hereditary, characterized by periods of emotional depression or of exaltation, which extend over months of time, and which usually recur in successive waves during the life-time of the individual. During the melancholic phase of such a wave, the picture presented is one of intense psychic depression associated with ideas of sinfulness, spiritual ruin, or moral unworthiness. There is the great agony of the lost soul, the hopelessness of a wasted past, or the belief in some crime never to be atoned. There is not, however, especially in that period of which we are now speaking, that blunting of the faculties, that change of the relationship to the environment, which is shown by deterioration of conduct, or dress and of speech. By a searching inquiry as to factors pointing to such degeneration, the differentiation is to be made, as well as, it need hardly be added, by the presence or absence of a history of previous attacks or of a family history of melancholia-mania or allied neuropathies.

In the above remarks I have purposely avoided dealing with the physical signs of paresis, for the reason that as soon as these make their appearance both neurasthenia and melancholia are set aside. I should here, however, mention the importance of an examination of the visual fields which, even in the very early stage of paresis, may show some contraction,—a forerunner of the more or less marked amblyopia present in advanced cases. Such contraction does not, however, serve to differentiate paresis necessarily from neurasthenia in which, in exceptional cases, contraction of the visual fields occurs as a fatigue symptom. Retinal hyperæsthesia, on the other hand, is not a symptom of paresis, and its existence would be decidedly in favor of neurasthenia. It is immaterial whether the physical signs first make their appearance as a loss or increase of tendon reactions, as loss of light reflex, as tremor of the lips or tongue, or in the form of speech disturbances. Their significance is always the same. This is also the case with the transient paralytic attacks so frequently met with, and I will not here discuss the relative importance of these symptoms, as their occurrence varies so greatly in different cases. My function, I take it, is to deal with that period of paresis before the physical signs became so pronounced as to render the diagnosis absolute. In all doubtful cases, before they have made their appearance, we must be guided in the formation of our opinion, by the outlines which I have indicated in my remarks. I should add, however, that to my mind there is one general physical sign which precedes all of the others, and by which we can distinguish often at a glance a case of beginning paresis from a case of neurasthenia or melancholia, and that is that curious and difficult-to-describe something which we term the "paretic manner." It is made up of those slight and almost infinitesimal changes in the facial expression and gestures of the patient, which to the clinician stamp the case as one of paresis. I do not mean the gross smoothing out of furrows, the gross loss of tone in the facial muscles, but that something in the eye, the face, the gestures, the words, which reveal that the patient is not in close and accurate touch with his surroundings, with his business affairs, with the fact of his illness or, for that matter, with any subject. It is the presence of this symptom which, in my opinion, places in sharp contrast the neurasthenic and the beginning paretic. Finally the significance of a history of specific infection, when present, is so obvious that it need not here be dwelt upon.

It is necessary to allude briefly to the differentiation of early paresis from alcoholism, brain syphilis, tabes dorsalis and brain tumor. When we come to draw distinctions between early pare-

sis and alcoholism, we come to a subject of great difficulty and much uncertainty. The difficulty is largely due to the fact that many paretics manifest, as one of their early symptoms, alcoholic excess. It is not necessary, before this audience, to point out the general principles upon which a differentiation is to be attempted; how we should endeavor to establish the presence or absence of those fundamental qualitative changes which characterize the inception of paresis. If in an alcoholic subject, obtusion to the proprieties and moralities is noted, we should remember that unless alcoholism has become confirmed, these symptoms all disappear during the intervals of sobriety, when the patient is free from the action of the poison. In the paretic, on the other hand, these mental changes persist even after the alcohol has for a time been withdrawn. Further, the symptoms of a beginning alcoholic dementia are rather those of a simple dementia of which speech disturbances, incoordination of movement and somnolence are not features. There is general psychic obtusion, slowness of thought and some impairment of memory. If the alcoholism has become more profound, auditory and visual hallucinations with mental confusion, or, it may be, with delusions of persecution or of jealousy, make their appearance. In other words, if alcoholic dementia be pronounced, it is likely to resemble confusional insanity on the one hand, or paranoia on the other, rather than paresis. Further, it is unnecessary to dwell upon the common symptoms of alcoholism, the bloated and relaxed countenance, the tremor, the gastric catarrh, the morning headache and the frequent peripheral neuritis. It is not necessary to call attention to the absence of pupillary phenomena, of characteristic changes in the knee-jerks, of tabetic pains, and especially of the paretic manner. Notwithstanding, as I have just stated, because of the frequent coexistence of paresis and alcoholic abuse, the differentiation is at times exceedingly difficult.

It is not my province here to enter into the extensive subject of the differentiation between paresis and brain syphilis. I can only say that we should remember the general rule, that in brain syphilis the symptoms are those of an organic lesion, either limited or diffused without qualitative mental changes. Somnolence and headache may be equally present, but tremor of lips, tongue or hands, slight incoordination, change in the facial expression, the paretic manner, none of these play any rôle in syphilis. In the early stage it is again the absence or presence of the qualitative mental changes that are important. The differential diagnosis may, however, be extremely difficult, and at times impossible. Here prolonged observation of the patient is the only satisfactory plan.

The relationship between paresis and locomotor ataxia, in the early stages of the two affections, is another subject which is fruitful of discussion, but one which would here be unsatisfactory; first, because the physical signs in the early stages are very few, and, secondly, because some of them are common to both affections, *e. g.*, tabetic pains, incoordination of movement, lessening of knee-jerk and beginning optic atrophy. As is well known, many cases which begin with the symptoms of tabes dorsalis end in undoubted paresis. All cases, however, of locomotor ataxia, presenting anomalies of the symptom-complex, such as preservation or exaggeration of the knee-jerk, or slight ataxia of the legs with marked ataxia of the arms,—cases of so-called superior tabes,—should be regarded with suspicion. It must be frankly admitted, however, that in the early stages a differentiation between paresis and tabes may be impossible. This is not surprising when we consider that paresis and tabes are not only very closely related, but are possibly one and the same disease. The pivotal point is again, not the presence or the character of special physical signs, but the presence of mental changes. If these be absent, paresis cannot be diagnosticated. Similar remarks apply to the differentiation between paresis and other gross organic disease of the brain. Brain tumors, for instance, when in silent regions, may produce none but general symptoms, and unless they be situated in the frontal region, mental changes are, as a rule, entirely wanting. Here again, it is the absence of qualitative mental phenomena upon which in early cases the differentiation is to be based.

Let me say in summarizing my views concerning the early recognition of paresis, that it is of the utmost importance to study carefully the symptoms of every so-called case of neurasthenia that comes before us. After physical signs have made their appearance, the recognition of the disease is relatively easy; but it is during the initial period, the neurasthenoid stage, as I term it, that the diagnosis should be made. It can be made, I believe, in the larger number of cases by bearing in mind the clear and well-defined symptomatology of chronic fatigue,—neurasthenia,—on the one hand, and the special symptoms of the mental weakness and degeneration of paresis on the other.

# XV. SYMPOSIUM ON GENERAL PARALYSIS OR PARESIS

## 3. The Comparative Frequency of General Paresis

By CHARLES G. WAGNER, M. D.
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As part of the symposium on paresis, I have been requested to present some statistics bearing upon the occurrence of this disease generally, and its frequency in the profession. Accordingly I have gathered the following data from such sources as I have found accessible.

Examination of the literature of paresis discloses that it has been recognized for a period of about eighty years, although claims are made that some cases were reported before the close of the eighteenth century. As early as 1815, Esquirol appears to have noted the fatal ending of paralysis and failure of speech in certain cases of insanity, but his writings do not indicate that he ever had a clear idea of general paresis as a distinct form of disease. One of his students, however, Georget, described it in 1820 under the name of chronic muscular paralysis. Delaye in 1824, called it "incomplete general paralysis," a name which has since been retained as one of those commonly in use. Calmeil published a complete description of the physical symptoms and anatomical lesions in general paresis in 1826, but all of these writers, and many others about this period, appear to have regarded the malady as a special form of paralysis superimposed upon insanity,—a complication of an already existing mental disorder rather than a distinct form. In 1839, Dr. W. A. F. Browne, Commissioner in Lunacy for Scotland, observed cases in that country, but it was not until 1843 that general paresis was recognized in America. In that year Dr. Luther Bell, of the McLean Asylum, now presided over by Dr. Edward Cowles, detected this disease in a number of patients, all of whom died within a comparatively short time.

Dr. Bell, in his annual report for 1843, stated that prior to 1840 he had never met with an instance of paresis in this country, although he had seen many cases abroad and had made diligent search for them in his own asylum and elsewhere on this side of the Atlantic. He says: "I have regarded it as a somewhat curious fact that it is only within the last few years that this disease has been admitted into this institution. As late as

my visit to Europe, in 1840, it was unknown within our walls, nor, after seeing it there, can I recall any case in our register which would at all meet its characteristics, rendering it certain that it was not overlooked."

Four years later, Dr. Pliny Earle reported several cases at the Bloomingdale Asylum, in New York City, and about the same time Dr. Amariah Brigham, of the New York State Lunatic Asylum, at Utica, is said to have had similar cases. I find, however, in Dr. Brigham's annual asylum reports only meagre references to general paralysis. In the years 1844 to 1847 he mentions, among the causes of death, paralysis in one or two cases each year. In 1848, the last year of his life, his report shows that five patients died of general paralysis, but in none of his reports does he publish a table showing the forms of insanity in the cases admitted, nor does he discuss the symptoms of the cases mentioned as terminating in death by general paralysis.

The first table of this kind published in the history of the institution at Utica, showing the forms of insanity admitted, is found in the report of Dr. N. D. Benedict, for the twelve months ending November 30, 1850, the year following that in which he succeeded Dr. Brigham as superintendent of that institution. His report shows that two cases of general paralysis were admitted during that year, and that there had been one remaining in the hospital at the close of the previous year. A few years later, Dr. Ranney, of the City Asylum, on Blackwell's Island, reported several cases as occurring in that institution. In 1866, Dr. John P. Gray, who had succeeded Dr. Benedict at Utica, read a paper before this society in which he gave an exhaustive review of several cases selected from a total of 119 that he had had under his personal observation.

Beginning with the year 1849, when the admission of the first case was recorded at the Utica Asylum, the reports of that institution show only a gradual increase in the number of general paretics admitted during the next ten years. The average number of patients of all kinds received annually into the institution during the period mentioned was 329, while the average number of paresis was five, or 1.5 per cent. The next decade, with an average annual admission of 351 patients, shows an increase in the number of cases received at the asylum, but a much more rapid increase in the number of general paretics that were annually brought there. The average annual admission of this class for the ten years was fifteen, or 4.3 per cent.,—but for the latter half of the decade the percentage was slightly above five per cent. This decade covered the Civil War and the four years immedi-

ately following. The query naturally arises as to the influence of that period of storm and stress as a causative factor in the production of insanity generally, and especially paresis. From 1870 to 1880 the average number of patients received annually at Utica was 434, whereas the average number of paretics received was twenty-one, or about five per cent. During the next ten years, from 1880 to 1890, the average number of patients annually admitted was 418, and the average number of paretics was twenty-nine, or seven per cent. For the last decade of the century, that is from 1890 to 1900, the average number of patients received annually was 327, and the average number of paretics was thirteen, or four per cent.

During the fifty years comprising the last half of the nineteenth century, there were received at Utica 18,843 insane persons, of whom 865 were cases of general paresis, the average percentage being, therefore, 4.5 per cent. The proportion of women to men was one to 7.5.

The Hudson River State Hospital was opened in 1871. During the first decade of its existence there were received 1,671 patients, of whom 130 were paretics,—7.75 per cent. During the second decade 3,208 patients were received, of whom 144, or 4.4 per cent., were cases of paresis. During the third decade the total number received was 5,735, of whom 361, or 6.3 per cent., were paretics. The total number of patients received in thirty years was 10,434, while the total number of cases of paresis was 672, or 6.4 per cent. Of these patients seventy-five were women and 597 were men, a proportion of one to eight.

From September 30, 1881, to October 1, 1901, there were admitted into the Buffalo State Hospital 8,243 patients. Of this number 391, or 4.74 per cent., were paretics, of whom sixty-five were women and 332 were men, a proportion of one to five.

The total number of patients received into the St. Lawrence State Hospital from December 9, 1890, when it was opened, to September 30, 1901, was 4,286. The number of cases of general paresis received during the same period was 208, or 4.8 per cent.

There were admitted to the Rochester State Hospital from the date of opening in July, 1891, to September 30, 1901, 1,183 patients, of whom 105, or 5.6 per cent., were general paretics.

At the Middletown State Homœopathic Hospital the number of patients admitted from the date of opening in 1874, to September 30, 1901, was 5,892; of these 292, or 4.9 per cent., were general paretics.

At the Binghamton State Hospital there were admitted on original commitments between October 1, 1890, and September

30, 1901, 2,226 patients: of these 111, or 4.9 per cent., were cases of general paresis, nineteen being women and ninety-two men, a proportion of about one to five.

From Dr. A. E. Macdonald, superintendent of the Manhattan State Hospital, East, I learn that during the past thirty years about 18,000 insane men have been received into that institution under both county and State care. Of this number sixteen per cent. have been cases of general paresis, and the annual admission rate has been nearly constant for several years past.

Although I have not the exact figures showing the number of women admitted to the female department of the Manhattan State Hospital, the reports of the State Commission in Lunacy indicate that it has not differed materially from the number of men received. If, therefore, due allowance be made for the number of paretics that were received among the female cases, we should probably find that the percentage of paretics in the total number of cases of insanity received was somewhat above nine per cent.

The total number of patients received into the Long Island State Hospital, at Flatbush, from 1896 to September 30, 1901, was 2,141. The number of cases of general paresis admitted during the same period was 250, or 11.5 per cent. Of these paretics twenty-seven were women and 223 were men, a proportion of one to eight.

At the Bloomingdale Asylum, White Plains, N. Y.,—practically a private institution—there were received during the ten years ending September 30, 1901, 1,230 patients. Of this number 180 men and twenty-five women, or 16.6 per cent., were suffering from general paresis, the proportion being one woman to seven men.

During the past thirteen years—the period covered by the reports of the State Commission in Lunacy—it appears that there have been received in all the State hospitals of New York State a grand total of 49,787 patients. Of these 3,307—a percentage of 6.6—have been cases of general paresis. This, however, is somewhat lower than the actual percentage of cases received, for the reason that under the operation of the State Care Law the State Commission in Lunacy has from time to time transferred large numbers of patients from one hospital to another, and these transfers have materially swelled the apparent number of admissions as shown by the reports of the Commission, whereas the number of cases of paretics has not been similarly affected by these transfers.

The following table shows the total annual admissions, the number of paretics received and their percentage in the State

hospital system of New York State during the past thirteen years:

| Year. | Admissions. | Paretics. | Percentage. |
|---|---|---|---|
| 1889 | 1,813 | 98 | 5.4 |
| 1890 | 1,942 | 66 | 3.4 |
| 1891 | 2,868 | 80 | 2.7 |
| 1892 | 2,627 | 114 | 4.3 |
| 1893 | 2,704 | 132 | 4.8 |
| 1894 | 4,003 | 152 | 3.7 |
| 1895 | 3,003 | 161 | 5.3 |
| 1896 | 5,615 | 399 | 7.1 |
| 1897 | 4,649 | 423 | 9.0 |
| 1898 | 5,542 | 448 | 8.0 |
| 1899 | 5,243 | 414 | 7.8 |
| 1900 | 4,862 | 396 | 8.0 |
| 1901 | 4,916 | 424 | 8.6 |
| | 49,787 | 3,307 | 6.6 |

In the *Journal of Mental Science* for July, 1900, Dr. Arthur E. Patterson, senior assistant medical officer of the City of London Asylum, at Dartford, analyzes 1,000 admissions, of whom 620 were men. Of the latter seventy-six, or twelve per cent., were general paretics, whereas of the 380 women eight, or not quite three per cent., were cases of general paralysis. The proportion of men to women suffering from this disease was six to one. Of the men forty-three were married, thirty were single, one was a widower, and in two instances the condition as to marriage was unknown. Of the women four were married, three were widowed and one was single. It would thus appear that the disease is met with more frequently in the married than in the single.

Only two of the men were under thirty years of age, thirty-four were between thirty and forty, and thirty were between forty and fifty,—whilst ten were between fifty and sixty. These figures show that no less than sixty-four out of the total seventy-six men were between the ages of thirty and fifty, whereas all of the women were between thirty and forty.

A recent report of the medical superintendent of the Cane Hill Asylum, in the County of London, shows that of 402 patients admitted during twelve months forty-two suffered from paresis, thirty-eight of whom were men, while four were women. Paretics, therefore, formed 10.4 per cent. of the admissions, the proportion of women to men being one to nine.

At the Claybury Asylum, in the same county, for a similiar period there were admitted 820 cases of insanity. Of these

eighty-seven were paretics, seventy-one being men and sixteen women. Paretics, therefore, formed ten per cent. of the total admissions, and the proportion of women to men was one to 4.5. Of the men received eighteen per cent. were cases of paresis.

At Hanwell Asylum the year's admissions numbered 534. Of the men nineteen per cent. were paretics, and of the women five per cent.

### Occupation

Of 1,300 cases of paresis recorded at the Manhattan State Hospital, East, only 8 were actors, while 7 were lawyers and 5 were physicians—the clergy not being represented. It would appear that while no particular profession, trade, business or occupation especially predisposes the individual to an attack of general paresis, every walk of life is represented. Among the cases under consideration were 109 ordinary laborers, 59 clerks, 45 tailors, 37 drivers, 35 bartenders, 32 painters, 32 cigarmakers, 31 carpenters, 29 salesmen, 28 shoemakers, 26 waitresses, 23 merchants, 20 machinists, 16 printers, 16 butchers, 17 bakers, 16 barbers, 16 engineers, 15 peddlers, 14 cooks, 13 musicians, 13 porters, 12 blacksmiths, and so on down through more than 200 different occupations.

Among 672 paretics at the Hudson River State Hospital were 10 civil engineers, 6 lawyers, 4 military or naval officers, 3 physicians and 2 authors.

Out of 208 at the St. Lawrence State Hospital there were 2 physicians, 35 laborers, 14 farmers, 6 commercial travelers, 11 railway employees and 20 housewives.

Among 120 cases at the Rochester State Hospital were 3 lawyers, 6 shoemakers, 5 merchants, 5 farmers, 8 laborers, 6 painters.

In 239 cases at the Buffalo State Hospital there were 4 physicians, 3 lawyers, 2 clergymen, 1 editor, 2 actors, 2 artists and 2 musicians.

At Flatbush, among 250 cases there were 6 druggists, 3 musicians, 1 physician, 1 veterinary surgeon, 1 artist and 1 dentist.

At the Bloomingdale Asylum, among 180 men admitted there were 9 lawyers, 5 physicians, 4 actors, 4 theatrical managers, 2 musicians, 1 teacher, 28 merchants, 27 clerks, 8 manufacturers, 8 brokers, 6 saloonkeepers, 4 police officers and 2 civil engineers.

In all of the institutions except Bloomingdale the laboring classes are largely represented.

### Duration

To Dr. Louis C. Pettit, second assistant physician at the Manhattan State Hospital, East, I am indebted for valuable data

regarding the duration of the disease collected by him from the wards and records of that institution. Thirteen hundred patients observed lived after admission an average period of eleven months each, the disease showing an average duration prior to admission of fifteen and three-fourths months. The total average duration of these cases was, therefore, a little more than two years. Thirty-two nations and over 250 occupations were represented in this death roll from general paresis. Of these paretics there were 484 of American birth, 335 Germans, 244 Irish, seventy-one English, thirty-one French, while the remaining 135 were about evenly distributed through twenty other nationalities, among them being two Chinamen. These figures show a remarkable preponderance of native Americans suffering from general paresis in an institution where more than two-thirds of the inmates were of foreign birth and over eighty per cent. of foreign parentage.

Dr. Pettit gives an interesting table which tends to show that general paresis rarely occurs before the twentieth year or after the age of sixty. In the 1,300 cases tabulated death occurred as follows:

| Age at death. | Cases. |
|---|---|
| 20 to 25 years | 4 |
| 25 to 30 " | 72 |
| 30 to 35 " | 173 |
| 35 to 40 " | 250 |
| 40 to 45 " | 272 |
| 45 to 50 " | 212 |
| 50 to 55 " | 152 |
| 55 to 60 " | 89 |
| 60 to 65 " | 53 |
| 65 to 70 " | 20 |
| 70 to 75 " | 2 |
| 75 to 80 " | 1 |
| | 1,300 |

Dr Asher, of the Dalldorf Asylum, Berlin, reports in the *Allgemeine Zeitschrift fur Psychiatrie*, Vol. XLVI., No. 1, that of 643 cases of general paresis in men treated in that institution two-thirds were between the ages of thirty-five and fifty. The average duration of life after admission was fourteen and one-half months, and only 16.8 per cent. lived two years after admission.

In 305 cases in which the date at which the symptoms first attracted attention was ascertained, the average duration was

twenty-six months. The progress of the disease seemed to be more rapid in the younger subjects. Between the ages of twenty and thirty-five the average duration of institution life was thirteen and one-half months; between thirty-five and fifty, fourteen and one-half months, and between fifty and seventy, fifteen months.

Dr. Asher found a definite hereditary predisposition in thirty-three per cent., and syphilitic infection in thirty-five per cent. Alcoholic intemperance was alleged in 37.6 per cent., and injury to the head in nine per cent. of the cases.

*The American Journal of Insanity* for January, 1896, contains a report showing that of 200 male cases of paresis in Krafft-Ebing's clinic, in Vienna, fifty-six per cent. were certainly syphilitic, twenty-five per cent. probably so, while in nineteen per cent. the data were insufficient to warrant a conclusion of probable syphilis.

In all the records of paresis studied in preparing this paper, I have found but a single instance of alleged recovery from the disease.

From this brief survey of the statistics of general paresis, it would appear that it forms about 8.75 per cent. of all cases of insanity; that it occurs most frequently between the ages of thirty and fifty; that it is gradually increasing in frequency at the present time; that men are about seven times as liable to the disease as women; that it is invariably fatal in its termination, and usually so in less than two and a half years. Furthermore, that it is nearly twice as frequent in large cities as in the country, and that heredity, syphilitic infection, and alcoholic indulgence are important factors in its production; that neither the members of the learned profession, teachers, students, musicians, nor actors, appear to be especially susceptible, nor does intellectual work or any other special kind of occupation seem to predispose the individual to paresis, but that general cerebral strain, with more or less hereditary influence, is found to have existed in the majority of cases. Overwork, sexual excesses, alcoholism, irregular habits of sleeping and eating and such accidents as sunstroke and cerebral traumatism appear to be the great factors in the production of this disease.

# XVI. SYMPOSIUM ON GENERAL PARALYSIS OR PARESIS

## 4. Treatment of Paresis; Its Limitations and Expectations

By EDWARD COWLES, M. D.
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The "*treatment of paresis*," as a subject for discussion, presents itself, at first sight, as difficult and uninspiring in view of its hopelessness. But I am asked to speak especially of the "*limitations and expectations*" of treatment; this leads the way to a field of inquiry in which lie some of the profoundest problems in medicine. The time now available being brief, I shall speak of our present unsatisfactory means of treatment of a disease as yet regarded as incurable, only to indicate the *limitations* under which we labor.

The diagnosis being made, the prognosis being a fatal ending usually after two to four years in which the manifestations of the disease have been recognized, we are limited to measures for palliating its consequences. The patient needs immediate protection when the onset of the disease is an acute attack of melancholia or mania; when the dementia comes on insidiously, protection is equally important of the personal and business interests both of the patient and his family. Custodial measures become therapeutic together with treatment of general symptoms, when remissions are promoted through improvement in physical health and strength, neurasthenic conditions being especially characteristic of the prodromic and early stages of the disease. The prescribed method always includes "tonics" in all appropriate forms, and a generous diet with interdiction of alcohol. Hydrotherapeutics, now coming into more general use, are often beneficial.

It is aside from all these generally indicated expedients for the management of the cases that the real therapeutic problem arises and baffles our art. The psychiatrist finds himself here in a remarkable position: it is that of being confronted by a well defined mental disease-form, with concurrent physical signs more distinctive than in any other mental disease. These point, by both sensory and motor symptoms, to lesions of the nervous system that show a recognizable underlying disease-process with progressive structural changes producing chiefly extensive degeneration of the nervous system. More than in any other of

the true mental diseases, which are such because the mental symptoms essentially constitute the disease-form, have researches in anatomical pathology been possible in the attempts to find an explanation of the mental symptoms. But, for some recent years, little advancement of our knowledge in this direction has been made. Therefore the psychiatrist, who must really do his clinical work from the standpoint of the general physician, has found a barren field of *limitations* for his therapeutic guides when he turns to neurological histology and pathological findings. This is a most significant fact, for, so far as this line of research can go, we are likely to come to the same limits in other forms of mental disease should there ever be discovered concomitant structural changes characteristic of them. The pathological anatomist as our pioneer leads us to this frontier of our realm,—to the Castle Mystery, and lays siege to it; when he fails to carry it by assault, he saps and mines, and employs the strategy of hypothesis, spies of subtle inference and arrows of swift conjecture, often Parthian arrows indeed. Still we wait before the impenetrable wall of our difficulty. It is with us, both in general medicine and psychiatry, much as it was with our fathers when they said the signs of inflammation were heat, redness and swelling. The work of penetration into that which underlies has gone deeper, but our attitude of inquiry remaining precisely the same, we have the superficial replaced by the parenchymatous. We are reaching the limits of knowledge through the study of change in structural form and appearances to the eye, the infinitesimal becomes the insurmountable. We are learning that, inasmuch as psychology and physiology can tell us nothing to explain the normal mechanism of mental activities, we can not expect to see, through the microscope, an explanation of disordered thought and feeling.

It would be a cause of great regret on my part if there should seem to be any disposition, in the hospital work which I represent, to diminish in the least the importance of research in pathological anatomy. But there are reasons for seeking an explanation of our clinical problems in the still deeper underlying plane of physiological chemistry. Let me quote from a statement made from this point of view:[1] "That microscopically visible structural changes in any tissue, or in the cells of any tissue, must be preceded by more or less pronounced metabolic changes is surely self-evident. Metabolic changes are chemical changes. Chemical changes are the physical exchanges and transformations that take place in the physical units of matter—the molecules; and the molecules are beyond the ken of the microscopist."

Turning now to ætiology, in accordance with the principles of general medicine, we find limitations in the logic of treatment under the leading conceptions of the ætiological factors of paresis which are syphilis and heredity, with alcohol and the stress of modern life contributing. Following the guidance offered by these factors, it has been common, outside of the hospitals, when the diagnosis is made and there is a suspicion of syphilis, to treat the cases with mercurials and iodides; in the hospitals this is found to be so futile, and even harmful, that the practice advocated by many alienists is generally followed in using antisyphilitic treatment only when active syphilis is present. With respect to heredity authorities differ. Our experience at the McLean Hospital agrees with that of many observers in the evidence it gives that paresis is due less to heredity than other forms of insanity. The rôle of heredity, in whatever relation it may bear to insanity in general, is that of including a constitutional instability. This neuropathic weakness when transmitted from a syphilitic parentage, or when induced as a sequel to an acquired syphilis, is regarded as having a like influence with stress from excessive mental activity. These predisposing factors working together tend to determine which part of the overworked mechanism is to yield to the active cause of the paretic disease. Alcohol may be a contributing factor also by reducing the normal resistance to morbid influences. In these ways comes the conception of neurasthenic conditions, constitutional or acquired, as having an intimate relation with the onset and course of the disease-process. Hence arise questions of early differential diagnosis between neurasthenia and paresis. Undoubtedly a neurasthenia may be the first to appear, when it is only the effect, and not a part of the cause, of the still unrecognized general paralysis. A history of syphilis always excites suspicion. Out of these ætiological considerations we get, so far, no clearer guides for treatment: antisyphilitic measures, theoretically indicated, fail, and we are left to deal with a general and very empirical conception of neurasthenia.

The history of the course that has been taken by the study of this problem leads to an interesting field. While the *limitations* of our therapeutics continue to be apparent, I can now enter upon the second part of my subject—the *expectations* of treatment. That paresis has its chiefest cause in specific disease is not a conclusion from any discoverable relations between known specific and paretic lesions. The arguments deal with the prevalence in cases of paresis of a history of acquired syphilitic infection, or of its inherited effects. This doctrine is gaining ground, although some authorities demur: it is argued that syphilis not

being proven in many cases it should be held not as an essential but only a predisposing cause. Krafft-Ebing's dictum, that general paralysis is a product of civilization and syphilization, and Oppenheim's statement that paresis is the outcome of stress and syphilis, give expression to opinions that indicate no more than a sequence of facts, showing the frequency with which specific infection is followed by paresis. As explanatory of a probable real connection in the pathology of these two diseases, it is becoming generally assumed that there is some intervening factor, or condition, that unites them. Oppenheim points to this in making the distinction that people without syphilis, but who are the subjects of mental stress, excitement and excesses, are liable to develop neurasthenia; the syphilitic neurasthenic, however, is liable to dermentia paralytica. That there may, or must be, an intermediate element between the two diseases is now either intimated or assumed by most writers, and alike by the advocates of the two leading theories of their pathogenesis relating respectively to the nervous and the vascular systems. We need not dwell upon the arguments for the opposing hypotheses, as to which is first in the disease-process, because they refer alike to the toxæmias as intervening factors. Though still hypothetical this indicates, at least, the trend of the time in medicine.

We come now to the subject that is of prime importance in our discussion of *expectations* in the treatment of paresis, and of our grounds for them; our problem lies distinctly in the field of general medicine putting the general physician and psychiatrist in precisely the same position toward it. It is not my part here to discuss the pathology of this disease, but it may be permissible to cite briefly some authoritative statements that set forth the aspects of the problem which I wish to consider.

Dr. Mott, in the *Archives of Neurology* for 1899, indicating his reasons for supposing that paresis is a primary degeneration of the neurone with secondary inflammatory changes, says, in other words, that "it is a parenchymatous degeneration due to a loss of durability of the nerve-cell—a premature decay of tissue in which inherited and acquired conditions take part, with the result that progressive death of the latest and most highly developed nervous structures ensues as soon as their initial energy is unable to cope with the antagonistic influences of environment."

Kraepelin,[2] regarding the changes in the nerve parenchyma as the primary alteration, thinks that the microscopic pictures of paretic lesions indicate intoxication. He says that everything points to a grave nutritional disorder, and that the disease is analogous to myxœdema, diabetes, osteomalacia, acromegaly, and

the like; he suggests that we have to assume an intervening element between syphilis and paresis, just as we have, for example, a myxœdema develop when the thyroid becomes destroyed by tuberculosis.

Wernicke,[3] regarding a primary destruction, or necrosis, of the nerve tissue, analogous to the degenerative neuritis in the peripheral nervous system, as the primary process, says the paralytic ætiology resembles most the action of poisons. But in general paralysis we must assume that the poison is constantly being produced in the body, as the progressive fatal characteristics can not be otherwise explained. This poison must be metasyphilitic, yet we must assume a bacterial action as the basis of the peculiar condition. The purport of this is that, as in other progressive remitting diseases, the acute and quiescent phases of paresis represent, respectively, the resistive reaction of the body to some toxin, and remissions of its activity indicating cessation of the toxæmia. The views of authorities generally harmonize with the conception of intervening factors. These may, of course, have their place outside of, as well as in, the nervous system itself, and elsewhere in the body. Although such representative opinions do not yet furnish us with guides to treatment, as they hardly take us beyond the stage of hypothesis, yet, nevertheless, they point to a toxæmic origin in the pathogenesis. Thus we as psychiatrists find ourselves engaged in the general movement of the time; and sharing in the great advancement in general medicine we are encouraged in our expectations of things hoped for, in our special field of mental medicine.

On the common ground of general medicine, it is of interest to refer to a statement, made from this point of view by Sir Dyce Duckworth, of the principles upon which our new position is based. In an address, in November, 1900, to the British Medico-Psychological Association, on "Mental Disorders Dependent on Toxæmia," he expressed the generally accepted opinions. He said that toxæmic states have been long recognized as clinical features of disease, and the sources of them are as varied as are the separate toxic elements which induce them. Progress in physiological chemistry and bacteriology has now furnished us with the means to explain these conditions. Referring to the action of auto-intoxications in disturbing the harmony of intimate brain-cell metabolism, he noted the deliria of many febrile conditions as examples of distinct toxic infections. After mentioning myxœdema as leading, in like manner, to mental disorders resulting from altered metabolism due to deficient thyroidal influence, it is stated that general paralysis is now re-

garded as coming into the category of auto-intoxications. His suggestion as to the course of the pathogenesis is one of the interesting variations of the hypothesis. Syphilis, although the common antecedent of paresis, does not, however, provide the toxin, and we must therefore view its part in the ætiology as leading to progressive degenerative nervous changes, which in turn so modify the intimate metabolism of the tissues as to set free toxic elements. As the various toxic agents which gain admission to the circulation manifest elective affinities for particular systems of neurons, hence the varied results of perverted nutrition and metabolism with the production of new toxins. While these fields of study are yet much unexplored, there are many investigators in them, and here and there knowledge is gained that guides to treatment.

We have now come in this discussion nearly to its ending, yet upon the grounds so far considered we find ourselves still in the region of hypotheses with waiting expectations of new light upon the treatment of paresis, but with reasonable faith in their final realization. To this practical end, indeed, we may be nearer than has yet been supposed. A new phase of the problem has been presented in contributions by Dr. Bruce and Dr. Ford Robertson, at a meeting, last June, of the Medico-Chirurgical Society of Edinburgh. Dr. Bruce, in his observations of paresis for a number of years noted the common occurrence of gastric and intestinal disorders, with exacerbations accompanied by rise of temperature and hyperleucocytosis. He suspected a toxæmia due to intestinal bacteria. Obtaining blood-serum by wet cupping for lumbago from a paretic patient having a well-marked remission in the second stage, he treated two earlier progressing cases with subcutaneous injections daily for three weeks. The result was complete remissions in both cases then of two years duration. Further experiments are in progress, to procure blood-serum from a horse immunized to bacillus coli. Dr. Bruce believes that small subcutaneous injections of such serum, for three weeks or a month may produce artificial remissions of this disease. His conclusions are:

1. General paralysis is a disease directly due to poisoning by the toxins of bacteria whose point of attack is through the gastric and intestinal mucous membrane.

2. The poisoning is probably a mixed poisoning, but the bacillus coli is apparently one of the noxious organisms.

3. The result of treatment with serum, taken from a case of general paralysis in a condition of remission and injected subcutaneously into an early progressive case, points strongly to

the fact that some form of serum treatment is the proper treatment for this as yet incurable disease.

Dr. Robertson, in his observations upon this subject, referring to Dr. Bruce's cases, takes the position, contrary to the opinions already cited, as to pathogenesis, that the theory of the existence of chronic toxæmia is virtually a farther elaboration of the view that the cerebral vascular lesions constitute the first anatomical alteration in general paralysis. He cites authorities defending this view and reaches the following conclusions:

General paralysis is dependent upon the occurrence of chronic toxæmia of gastro-intestinal origin; the toxins are mainly bacterial and are formed in consequence of a partial breakdown of those forces by which the harmful development of the micro-organisms that constitute the ordinary flora of the alimentary tract is normally prevented; the toxins are absorbed and tend specially to produce proliferative and degenerative changes in the vessels of the central nervous system, and these vascular changes tend to set in earliest in those parts of the brain that are relatively best supplied with blood, because their walls are brought in contact with the largest quantities of toxins. The part played by syphilis in the pathogenesis of general paralysis and tabes dorsalis is essentially that of altering the natural immunity; and the treatment should be directed primarily to the correction of the disorder of the alimentary tract. Probably the only means by which it will be found possible to check the excessive growth of the gastro-intestinal bacteria is that of the employment of specific antitoxins; and to avert the disease by such means may be more practicable than would at first sight appear, because it is probable that the specially injurious toxins are the products of only a few bacterial forms.

These contributions are very interesting and are most stimulating to further researches in the direction pointed out by Dr. Bruce's work. While not yet conclusive, these results are consistent with the general trend of opinion that the toxæmias are the intervening factors; and, for the present, it is along this line of research that our expectations are led. If they are verified as a substantial addition to our knowledge, then we may be fairly placed on new ground in respect to mental diseases in general.

This discussion of the treatment of paresis was hardly expected, I presume, to lead to any definite conclusion; indeed, the statement of the subject suggests speculative inquiry. But still we are on firm foundations, upon the principles of bacteriology and physiological chemistry. There are several by-products of such a study as this. We are shown the limitations of patho-

logical anatomy, that instead of expecting to find explanations of mental symptoms in terms of structure, we must seek in the deeper plane of the chemistry of nutrition explanations of both function and structure, and the changes in them. We see that the final test of all observations, hypothesis and theory, is treatment; that we who minister to the sick must apply all the needed knowledge that can be gained; that we, with our problem in the living patient, do right to exalt the clinic, for the uses of which we may claim all the contributions of expert research. It is in the arena of the clinic that the patient and the physician are the leading players in the game of life and death.

1. Dr. Otto Folin, Chemical Laboratory, McLean Hospital. Notes on Relation of Pathological Chemistry to Pathological Anatomy.
2. Psychiatrie, 6th ed. Leipzig, 1899.
3. Grundriss der Psychiatrie, 1900, Leipzig.

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## XVII. THE CHANGES OF THE LEUCOCYTES IN DISEASE AS AN AID TO DIAGNOSIS AND PROGNOSIS

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Among all the factors in the development of modern medicine, developments which have definitely placed it among the exact sciences, and removed it from its former condition—a cosmos of inexact and empirical conclusions—nothing has been so potent as the applications of laboratory methods to each and every problem presented. The pathological laboratory, the bacteriological laboratory, the laboratories of chemistry, of pharmacology and of hygiene, have each done great service in this development. And yet not until a comparatively recent time has an attempt been made to extract the clinical essence, as it were, from these various storehouses of knowledge, and to turn to a purely clinical laboratory for a solution of those most practical and important of problems—the diagnosis, the prognosis and the treatment of disease. The rapid opening of new lines of investigation and the ever increasing number of methods of examination have now made this laboratory an indispensable adjuvant to the physician and surgeon. Among all the subdivisions of the subject, none is more important than that devoted to the study of the blood and its changes in health and disease.

Yet this is not to be wondered at, when we consider the con-

stitution of the blood and the multiplicity of its functions, to carry oxygen and food stuffs to the tissues, to carry away the waste products of cellular metabolism to the lungs and the excretory organs, to act as a medium for the transmission of the internal secretions of various glands, to aid in equalizing the temperature and water contents of the body, to furnish the agents designed to destroy or remove invading bacteria and other foreign substances, and to furnish the substances out of which the pigments and many of the various secretions of the body are elaborated. Indeed the work upon the blood has been of such magnitude that division and subdivision have become necessary, so that now, broadly speaking, such work may be differentiated as follows:

*a*. The study of the red blood corpuscles and hemoglobin, of paramount importance to the physician in the diagnosis and prognosis of the primary and secondary anæmias, of great aid to the surgeon in deciding for or against the advisibility of operation, and extremely useful to the therapeutist in determining the value of various forms of treatment.

*b*. The study of the leucocytes or white blood corpuscles, to the value of which this article will devote itself exclusively.

*c*. The study of the chemistry of the blood and the quantitative and qualitative study of the substances normally and abnormally present, an enormous field, waiting only for the development of methods of greater refinement in bio-chemistry to throw open to an eager band of explorers, in the hope of settling many of the unanswered questions regarding the normal functions of the body as well as its pathological variations.

*d*. The relation of the blood to that broadest and most important question, serum diagnosis and immunity, made doubly interesting by the recent brilliant contributions to this subject by Ehrlich, Wasserman and others.

That the subject of our discussion, the leucocyte, is an important cell in the animal economy seems probable from the fact that it is met with, as shown in Metchnikoff's brilliant studies, even in the very low forms of animal life where its functions and characteristics seem to be almost identical with those among the higher members of the animal kingdom. From Virchow's first description of the presence of an increase of these cells in various diseases and pathological conditions, their study has been a favorite one both with the pathologist and the clinician, and has been a great factor in giving us a clearer conception of various morbid processes.

The number normally present in human blood per cubic millimeter is given by various observers as from four thousand to

ten thousand, while the percentage of the various forms of leucocytes (for, as is well known, the white blood cells are not all of one kind, but show several varieties,) is given in the case of the small mononuclear leucocytes from fifteen to twenty-five per cent., the large mononuclear and transitional forms from four to eight per cent., the polymorphonuclear neutrophiles from sixty-five to eighty per cent., and the eosinophiles from one to five per cent. in the different tables.

From a series of observations made by us upon fifty normal human beings, we concluded that the average normal number of leucocytes per cubic millimeter was six thousand five hundred, of which seventy-four per cent. should be polymorphonuclear neutrophiles, eighteen per cent. lymphocytes, six per cent. large mononuclear and transitional cells, and two per cent. eosinophiles.

Work done since the completion of this series has led us to suppose that the above figures give slightly too high percentages in the case of the neutrophiles and eosinophiles, and rather too low in the case of the lymphocytes. Before discussing the changes in the total number of the leucocytes or in the relative proportion of the various forms as an aid to diagnosis and prognosis, let us briefly sketch the various theories held regarding the seat and mode of origin of the various kinds, and the significance of leucocytosis, what it represents in its broadest sense, and what it tells us both as regards the condition of the hematopoietic centers and of the body as a whole.

Ehrlich, with whose name the study of the leucocytes will always be indissolubly connected, believes that the lymphocytes are formed in the lymph glands, the neutrophiles and eosinophiles in the bone-marrow from pre-existing neutrophilic and eosinophilic cells, while the spleen is normally not an organ of hematogenesis, but rather of hematolysis. Uskoff, on the other hand, believes that all the white blood cells are derived from one form, the lymphocyte, the growth occurring mainly in the circulating blood, and Gulland, who has the same belief, adds that "The especial kind found in each locality depends upon the surroundings and conditions in which the cells live," a view to which Pfeiffer subscribes, opposing Ehrlich's ideas and basing his conclusions that the granulations are not specific upon his observations that the same granule may be present in different types of cell, and that different granules may be present in the same cell. According to the recent work of Korokoff, on the other hand, the spleen plays the most important rôle in the origin of the lymphocytes, while Pappenheim believes that these cells are derived from pre-existing cells of similar character in

the bone-marrow. Hardy and Kanthack possess still different ideas on the subject, namely, that the different leucocytes are of distinctly different nature and take their origin in different parts of the body, the lymphocytes from the lymphoid tissues, the neutrophiles from the intestinal tract, and the eosinophiles from the serous membranes.

While some other views are held regarding the mode of origin of the various forms, the above theories will illustrate how widely different are the views regarding this question, Ehrlich believing firmly in the doctrine of the specificity of the cell-granules and, *ipso facto*, in their distinctly separate mode of formation, while numerous observers believe that all the leucocytes are derived from one original cell, the lymphocyte.

Although there are some differences of opinion, yet there is much more unanimity regarding the function of the leucocytes and the significance of leucocytosis. The brilliant work of Metchnikoff, followed by the observations of Buchner, Gabritschewsky and others, has shown beyond a doubt that one, and probably the most important, function of the leucocytes, or at least of those forms present in the blood in largest amount, the neutrophiles, is one of phagocytosis, *i. e.*, the removal or destruction of bacterial, chemical or mechanical irritants, or the products of bacterial activity. The discovery of a distinct bactericidal property of the serum by Hankin, Buchner, Behring, and others, has lead to the development of a humoral in place of a phagocytic theory of immunity, but the demonstration that the bactericidal agent in serum, lymph and exudates, is a nucleoproteid derived from the leucocytes, has drawn these two theories of immunity closely together, and has accentuated the value of the leucocyte in the defense against disease-producing bacteria and toxins. Hankin especially has insisted upon the secretion by the leucocytes, especially the eosinophiles, of an alexine, which is bactericidal, while Hahn, Van der Velde, and many others, have demonstrated that the alexines are the secretory products of the leucocytes, especially the neutrophilic cells. As to the function of the lymphocytes, according to Ehrlich, although not to all observers, this form of leucocytosis is passive, *i. e.*, not due to the influence of chemotactic substances, and probably is of little or no importance in phagocytosis.

Besides their most important rôle—one of defense—the leucytes are undoubtedly important factors in the resorption of the products of cellular destruction and necrosis, in transforming their products and in aiding their elimination, while possibly they play an active rôle in nutrition, and may be regarded as cells filled with what may be called an alimentary reserve.

In discussing leucocytosis, it is essential to first draw the distinction between the physiological and pathological type, and then to discuss the different varieties of the latter. The physiological leucocytosis is met with during the digestion of foodstuffs, in pregnancy, at least in the case of the primiparous, in the new-born, after cold baths and violent exercise (in the last two mentioned conditions this is more apparent than real, and is probably due to vasomotor phenomena and an unequal distribution of the leucocytes in central and peripheral circulation). Clinically, the digestive leucocytosis is of importance because its absence is indicative of some disorder characterized by distinct pathological changes in the gastro-intestinal tract, although it is not, as originally supposed, pathognomonic of gastric carcinoma, while the leucocytosis of pregnancy and of infancy should be remembered to prevent a misinterpretation of blood-findings in these conditions. A practical point in connection with physiological leucocytosis is that it teaches us that the blood should never be examined for pathological changes during the height of digestion, but rather on a fasting stomach when the degree of leucocytosis will be a criterion of one factor alone, and not of a combination of two factors, one physiological and one pathological.

The subject, pathological leucocytosis and the aid derived from it in our conception of the nature and treatment of disease, is so large that it will be possible here only to touch upon the more important findings in the field. As we have different forms of white blood cells, so we have different forms of pathological leucocytosis, according to which of these forms is increased; thus we may have (a) the common or polymorphonuclear neutrophilic leucocytosis, the condition met with in most infectious diseases and inflammatory conditions, (b) eosinophilia or eosinophilic leucocytosis, a rarer but no less interesting condition, met with regularly in various diseases of the skin, in bronchial asthma and myelogenous leukemia, and various diseases due to intestinal parasites, besides being met with occasionally in a variety of other conditions, (c) lymphocytosis, the passive leucocytosis of Ehrlich, the condition met with normally in childhood and present in various morbid processes associated with diseased conditions of the lymphatic apparatus and in a few of the acute infectious diseases, as whooping cough and typhoid fever.

The opposite condition, a diminished number of leucocytes, a leucopenia or hypo-leucocytosis, is met with regularly in certain diseases, and is of no less value in determining diagnosis and prognosis. Whether this condition is due to the presence

of substances possessing the property of negative chemotaxis, or whether a slowness and insufficiency of leucocytic production, or unequal leucocytic distribution, is the cause, it is impossible to say at the present moment. The work of Bohland, on the effect of typhoid toxins upon the leucocytes, however, seems to show that in some cases, at least, the first theory is tenable.

Let us consider now, briefly, the important diseases in which the changes in the leucocytes are of aid in diagnosis and prognosis, going first into the field of internal medicine, then into that of surgery. Obviously, the field is so vast that we will here merely be able to touch upon many phenomena, the importance of which would in reality justify a much more exhaustive consideration.

Although in the anemias we devote most attention to the study of the red corpuscles, yet in determining the prognosis in the severe cases, valuable signs are to be derived from the character of the leucocytes, a diminution of leucocytes below normal and a relative increase of the small mononuclears being bad prognostic signs. Let us briefly cite two cases in point, both seen at about the same time, both in practically the same condition, and both suffering from the same disease, pernicious anemia. The red blood and hemoglobin counts were practically the same in each, but one showed numbers of megaloblasts and only between two thousand and three thousand leucocytes per cubic millimeter, the other very few megaloblasts and between seven thousand and eight thousand leucocytes; the former died in less than a week, the latter recovered from that attack and did not die until three years later, from a recurrence of the condition, and this time the blood picture was practically the same as in the first case, *i. e.*, many megaloblasts and marked leucopenia.

In the case of the acute infectious diseases, the greatest aid from leucocyte counting has come in typhoid and malarial fevers, tuberculosis, influenza, whooping cough, measles, scarlet fever, diphtheria and pneumonia. The presence of a diminished number of leucocytes in a case characterized by a persistent fever is of the greatest aid in differentiating typhoid fever, especially in the early stages of the disease, before the Widal reaction is obtainable, from central pneumonia, appendicitis, and various inflammatory and suppurative processes, all of which are characterized by a marked leucocytosis; so many cases of suppurating ovarian cysts, pyosalpinx, and other conditions characterized by persistent fever, have been mistaken for typhoid fever that a blood examination, if only the examination of a freshly prepared slide, should always be made in every case of such nature, when the presence of a leucocytosis will exclude typhoid fever.

Naegeli, in a recent contribution of great value, gives the results of his studies on the leucocytic changes in the various stages of typhoid fever; from these he concludes that favorable prognostic indications are the early appearance of the eosinophiles, the moderate diminution in the polymorpho-nuclear neutrophiles, and the extreme increase of the lymphocytes. The presence of leucocytosis in typhoid fever points at once to some complication, often a perforation, and in the asthenic cases, in which symptoms are slight, due to the intense toxemia, this may be the only means of diagnosing such a condition, and, *ipso facto,* operating, and very possibly saving the patient's life. This point cannot be too strongly insisted upon, for the only hope of preventing typhoid perforations from terminating fatally lies in a rapidly reached diagnosis and immediate operation. In malaria, a diminution of leucocytes is regularly met with, and, unless the parasite be found, even the most typical case from the clinical standpoint should not be so diagnosed in the presence of a leucocytosis, as occasionally cases of pyosalpinx and other suppurative conditions, with an absolutely regularly intermittent temperature are met with, and here the presence of a leucocytosis is of the greatest aid.

The absence of a leucocytosis in cases of influenza, and the distinct diminution in the cases of the abdominal type of the disease are of value in arriving at a differential diagnosis; for in the ordinary form of the disease, in the catarrhal stage, the absence of leucocytosis may serve to differentiate it from whooping cough, in which a leucocytosis of from fifteen to twenty-five thousand per centimeter is present, with a marked relative increase of the lymphocytes, as shown by Frölich and Meunier and DeAmicis and Pacchioni. Our own observations in five cases of the former disease, in which we have examined the blood, are entirely confirmatory of these results, while in the past year, during an epidemic of whooping cough, the absence of a leucocytosis has made us diagnose as influenza two cases which clinically presented all the signs of the catarrhal stage of pertussis, a diagnosis which was borne out by the future conduct of the cases. In the abdominal type of influenza, the distinct decrease of leucocytes is of value in differentiating the condition from appendicitis, a problem often of no slight difficulty in the cases of very young children.

In the case of the early diagnosis of scarlet fever and measles, the presence of a leucocytosis is significant of the former, of a leucopenia of the latter disease: while prognostically, in scarlet fever, the presence of a distinct eosinophilia beginning on the second or third day and reaching from eight to fifteen per cent.

in the second or third week is a favorable sign, while the rapid disappearance of eosinophiles is of grave import prognostically. These results of Kotschetkoff have been confirmed by us in four cases, all of which recovered and all of which showed an eosinophilia of over six per cent.

In diphtheria, Engel regards a high percentage of myelocytes as an unfavorable sign, while Besredka believes that if one or two days after the injection of the antitoxin the percentage of polymorphonuclear neutrophiles is sixty or more, the prognosis in good; with a higher temperature and fifty per cent., the prognosis is bad, while, if below fifty per cent., the prognosis is fatal.

The absence of a leucocytosis in uncomplicated tuberculosis is of value, in the first place, in differentiating tuberculosis from other inflammations of various organs and tissues characterized by an identical train of symptoms, while the appearance of a leucocytosis in tuberculous cases points at once to there being a secondary infection with pyogenic micro-organisms, which may be of the greatest value in determining upon immediate operation, in the bone and joint cases especially.

The presence of the characteristic leucocytic picture in the case of lymphatic and spleno-myelogenous leukemia gives us the only exact method of diagnosing these cases from tuberculous or syphilitic adenitis, Hodgkin's disease or sarcomatosis of the lymph glands on the one hand, and on the other, from Banti's disease, chronic malaria with enlarged spleen, tuberculous, syphilitic or malignant growths of the spleen, hydronephrosis or renal or ovarian neoplasms. We well remember one case, sent to the Johns Hopkins Hospital to be operated upon for a large ovarian cyst, where an examination of the blood at once showed it to be a case of splenomyelogenous leukemia, in which, obviously, a very different mode of treatment is to be employed.

There is not time for us to touch here upon the work of Löwit in regard to his supposed intra- and extra-leucocytic protozoa of leukemia, but the work of Türk and others throws grave doubt up Löwit's conclusions.

As to the prognosis in leukemia, Taylor describes marked degenerative changes in the leucocytes towards the end of the disease, while Rosenfeld, from a careful clinical and pathological study of three cases, thinks that in lymphatic leukemia the large mononuclears appear when the bone-marrow is affected, a lymphadenoid degeneration taking place, and when such a blood picture is found, it means that the disease is rapidly leading to a fatal termination.

The presence of a marked increase of eosinophiles in the blood will serve to differentiate bronchial from renal or cardiac asthma.

The greatest value of the leucocyte counting in pneumonia is that by its grade we learn something of the severity of the process, while if the leucocytes do not descend to normal with the drop in temperature, we know that the condition is one of pseudo-crisis, and not a true crisis. In this disease, as in practically all other conditions usually associated with a leucocytosis, the presence of a leucopenia is the most unfavorable of signs, as it points to an absolute lack of reactive tendency on the part of the organism, and is almost invariably associated with a fatal issue.

Very interesting in this connection, and also in connection with chemotaxis, is the recent work of Bentvegna and Carin, who found that after doses of arsenic, iodine and bichloride of mercury, which were not fatal, a marked leucocytosis was found, while in the fatal cases, a diminution of leucocytes occurred, and with this a diminution in the bactericidal powers of the blood. This is of especial interest because it shows that chemotactic powers may be possessed by simple inorganic chemicals as well as by the complicated toxins of bacterial and cellular activity.

The constant presence of a mild grade of leucocytosis after ether anæsthesia, and of a slight decrease in the number of leucocytes after chloroform anæsthesia (Penassi), is of especial interest to the surgeon.

Among other cases of toxic leucocytosis may be mentioned that due to various drugs, as several of the coal tar remedies. We have but recently seen a case of severe acetanilid poisoning in a young girl who took the drug secretly, in which the leucocytes reached thirty thousand per cubic millimeter, twelve per cent. of which were eosinophiles; undoubtedly further study along this line may prove of great aid in diagnosing various forms of secret drug habits.

Among the most interesting diseases with which blood changes are associated may be mentioned those due to animal parasites, especially those invading the intestinal canal. The presence of an increasing number of cases of anchylostomiasis in the United States, and the probability that many more of similar nature will be met with among the soldiers returning from the Philippines, should lead us to make a most careful examination of the stools in all cases of progressive anemia associated with marked eosinophilia; while, we think, the diagnosis of trichinosis can now be made, even in the most sporadic and atypical of cases by the remarkable increase of the eosinophile cells in this disease.

Since our original report in the *Johns Hospkins Hospital Bul-*

*letin*, April, 1897, of the presence of a marked eosinophilia in trichinosis, and the diagnostic value of this blood phenomenon, especially in differentiating this disease from other diseases associated with gastro-intestinal or muscular symptoms, numerous observations have been reported, all tending to substantiate this view. We reported three additional cases (*Journal of Experimental Medicine*, 1898, III, No. 3, and *Medical News*, 1899, January 7), all of which showed from forty to sixty-eight per cent. of eosinophiles in the circulating blood, and trichinæ in the muscle, of which a small portion was removed in each case for examination.

Atkinson (*Philadelphia Medical Journal*, June 3, 1899) reports a case substantiated by muscle examination, in which the marked eosinophilia led to the diagnosis being made, while Blumer and Neuman (*American Journal of the Medical Sciences*, January, 1900) report a family outbreak of the disease, in which nine persons were affected, and where the symptoms markedly resembled those of typhoid fever. The diagnosis was made from the blood examination, which showed a leucocytosis, with a great increase of the eosinophiles, while trichinæ were found in excised portions of the muscle. Stump (*Philadelphia Medical Journal*, June 17, 1899) reports three cases diagnosed by the marked eosinophilia, and Kerr (*Philadelphia Medical Journal*, August 25, 1900) reports two cases, in one of which the diagnosis was not even suggested until after the blood examination. The leucocytosis in each of Kerr's cases reached twenty-five thousand, while the eosinophiles reached the remarkably high count of 68.7 per cent. and 86.6 per cent.

Gwyn (*Centralblatt fur Bakteriologie*, 1899, XXV, p. 746) reported a case diagnosed by the marked eosinophilia, and recently Gordinier (*Medical News*, December 22, 1900) has reported two cases in which the diagnosis was made by this means, and in which he gives a careful review of the literature of the subject. As to the mode of origin of the eosinophiles in these cases the views of the different observers differ somewhat, we believing that they may possibly be derived from the neutrophiles, the transition taking place in the affected portions of the muscle, while Howard believes that they are derived from the plasma cells, which, in turn, are probably derived from the large mononuclears. Kerr, from a careful study of his two cases, differs from Howard, and is opposed to the view that they are derived from the large mononuclears.

A very recent observation by Courmont, that there is a distinct leucocytosis of the neutrophilic type, these cells often reaching ninety-five per cent., in all cases of rabies, seems liable

to prove of great value in determining whether or not a suspected animal is affected with this disease.

Regarding the value of leucocyte counting in surgery, we feel that the question is no longer *sub judice*. Keeping in mind the exact nature of leucocytosis, and how it represents the conflict of two factors, virulence of infection and resistance of patient, we can derive a vast amount of knowledge from its study in surgical cases. If we have the clinical picture of a severe infection, peritonitis for instance, and the leucocytes are markedly subnormal, operative procedures are probably useless, as the prognosis is almost surely fatal; in cases of a high or moderate leucocyte count, the resistance of the patient is greater and the prognosis better. There is probably no disease of importance to surgeons in which leucocyte counting is of more value than in appendicitis, for the following reasons: (1) Its presence or absence tells whether we are dealing with an inflammation of the appendix, or with a case of hysteria, floating kidney with twisted ureter, gall-stones or renal calculus, or the gastro-intestinal type of influenza, these conditions not being associated with a leucocytosis; (2) the grade of the leucocytosis tells us much regarding the severity of the infection, a safe rule being, that if the leucocytes are above eighteen thousand or twenty thousand, operate immediately, if below, wait and watch leucocyte count and symptoms with great care to see if the process is diminishing or progressing; (3) a systematic counting will show whether the condition is becoming better or worse, and will furnish the safest of all criteria as to beginning perforation and general peritonitis, with necessity for immediate operation; (4) it may be our only means of diagnosis in the fulminating cases, especially in children, in whom pain, nausea and muscle spasm may be practically absent, due either to the appendix becoming gangrenous almost immediately, or to its being situated deep down in the pelvis. In connection with the value of leucocyte counting in appendicitis, let me briefly quote two cases:

Case I.—A patient in whom immediate operation was undesirable on account of his poor general condition; the leucocytes, counted every four hours, varied between fifteen thousand and twenty thousand for twenty-four hours, when they rose suddenly to thirty-two thousand; operation was immediately performed, and a beginning perforation found in the appendix.

Case II.—A young boy, who, the morning after a summer-time dissipation of strawberries, ice cream and soda water, had an attack of nausea with slight epigastric pain, but no rise of pulse or temperature, and no local swelling or tenderness. The nausea rapidly yielded to small doses of bismuth, but, as the pulse rose from about eighty to ninety-five, and the

child looked ill, a leucocyte count was made, and seventeen thousand leucocytes per cubic millimeter found. Appendicitis was considered probable, although the temperature did not begin to rise until the second morning. At two o'clock p. m. it had reached one hundred degrees. The leucocytes, which had remained about seventeen thousand, suddenly jumped to thirty-four thousand. An operation was immediately performed, and an enormously long, completely gangrenous appendix, seated almost entirely in the pelvis, with a fresh perforation about its middle, and a beginning peritonitis, were found. Both patients recovered.

I know that these are rather rare cases, yet they are liable to be encountered by any physician, and they exemplify the immense aid blood examination may be. In the second case, it undoubtedly saved the patient's life. No less important is leucocyte counting after an operation: many cases present all the symptoms of a general peritonitis, nausea, vomiting and constipation, with a tympanitic, distended abdomen, in which the determination of the exact condition is a matter of immense importance. Peritonitis is associated almost invariably, and in practically all cases in which operative procedures offer any hope of success, with a leucocytosis, and as an autointoxication from the gastro-intestinal tract shows no, or very slight, leucocytic increase, we at once see what a valuable aid the leucocyte count may be. The first condition is to be treated by operation and drainage, the second by purgation, and the life of the patient depends upon our correct interpretation of the clinical picture presented. We have seen several cases within the past few months in which the leucocyte determination alone prevented the surgeon from operating secondarily, and where the subsequent course of the case showed that the condition was one of autointoxication. Thus we cannot agree with Hubbard, Deaver and others, who assign but little practical value to leucocyte counting in surgery. We feel that some of them, at least, have missed the vital point from their blood examinations when they reach this conclusion. It is not the establishment of fixed rules, between the grade of leucocytosis and the special pathologic condition, as they attempted and naturally failed to do, that is of great importance, but it is the results obtained by frequently counting the leucocytes in the individual case, which is of inestimable value in showing whether the condition is lessening or progressing. In numerous other surgical conditions the presence or absence of a leucocytosis is of very great assistance, as for instance in intestinal obstruction, where the entrance of gangrene and localized peritonitis is shown by an increase of the leucocytes; in differentiating abscess of the liver from malaria, duodenal catarrh or impacted gall-stones, of which condition

two interesting cases diagnosed by blood examination have been reported by McLean; in diagnosing pyosalpinx from other pelvic conditions, or from typhoid fever or malaria, osteomyelitis from rheumatism or neuralgia, while the lack of increase of leucocytes in uncomplicated tuberculosis is of aid both in differentiating the various forms of arthritis, and also in determining the presence or absence of secondarily invading pus-organisms. The presence of a marked leucocytosis associated with a diminution of red blood corpuscles in the case of hemorrhage, is of great help in determining the cause of shock, as well as in reaching a diagnosis of the various forms of internal hemorrhage. This, in brief, tells something of what the study of the changes in the leucocytes has done for the physician and the surgeon in diagnosing and treating diseases, and in helping each in arriving at a rational prognosis.

It has rendered possible the diagnosis of a number of diseases, as the leukemias and trichinosis, besides assisting markedly in the diagnosis of many more. It has given valuable aid in the prognosis of all forms of infection and inflammation, as pneumonia, peritonitis and appendicitis; of the anemias, of scarlet fever and of many other diseases.

It has furnished us with the means of discriminating diseases which present clinical pictures of marked similarity, such as central pneumonia and typhoid fever, appendicitis, and conditions with similar symptoms but with no infection, peritonitis and autointoxication from the intestinal tract, lymphatic leukemia and Hodgkin's disease, myelogenous leukemia and Banti's disease, and many others.

It has furnished the surgeon with a valuable diagnostic sign in all cases of infection and inflammation, besides being a criterion of great value in determining whether the process is diminishing or increasing. It has done these things and many more, but it is not infallible.

It is not worthy, as yet, of the blind abiding faith placed in it by some, nor should it receive the blame and criticism it has from others, especially many of our surgical brethren, who, too often, have combined poverty of technique with deficiency of knowledge of the real significance of these leucocytic changes in censuring what a greater knowledge would have made them praise. Let us rather realize both its uses and its limitations; let us regard it as a valuable aid in diagnosis and prognosis, and yet not the only staff upon which to lean; let our diagnosis be reached by a co-ordination and comparison of this with all the other symptoms of the disease in question. Let us study the blood changes more and more carefully, and have an ever

tion. The sputum, slight as it was, was saved and examined, but no tubercle bacilli were found.

The heart was apparently enlarged. The apex beat was in the mamillary line. The systole was strong and regular, and the pulse 84. There were no murmurs, and the second sound was exaggerated, particularly over the pulmonary valve.

The uvula was elongated, and was clipped. The pharynx, naso-pharynx and nasal mucous membrane presented a mild catarrhal process. There was no enlargement of the various tonsils. The temperature was 99° F. The urine was 1.022, acid +, no albumin, no sugar, and under the microscope presented some uric acid crystals and slight epithelial debris, after use of centrifuge. The blood gave evidence only of a simple anæmia. The diagnosis was eczema and lymphatic pseudo-leukæmia, with pressure on primary bronchi, particularly of right side.

His diet was carefully prescribed. He was asked to take no violent exercise, and no baths except for necessary cleanliness, but to use inunctions of simple oils instead. He was prescribed inunctions of forty-five grains of unguent. Crède daily, and internally ten grains of sodium salicylate every four hours, and strychnine sulphate, gr. 1-30, three times a day.

*On August 2d*, he reported that while the itching of the skin was just as bad, the skin lesions were much better. There was hardly a single eczematous patch to be found on his body, and the thickened patches on hands and shins had almost disappeared. At this time the glandular enlargement in the neck was somewhat greater. Increasing doses of arsenic were prescribed.

After another week, on August 9th, he presented himself in the following condition. The itching was still intense. The eczematous patches had disappeared, but now over arms, legs, thighs and trunk isolated pustules with scabs were present. He said that the itching had been so intense he had scratched off the tops with their drops of pus. Above the sternum presented a greatly enlarged lymph node, and those above the clavicles had increased in size. The cough was more troublesome, and on examination the breath and voice sounds were hyperresonant over the left lung, and much less distinct over the right, in the standing position. The tongue was coated, and the appetite diminished. The temperature was 100° F. and pulse 94, with respiration of 28. Arsenic and ungt. Crède were discontinued, and iodides with alkalies were prescribed.

He next presented himself August 15th. My notes on that day say: Skin very much better, lungs clearer, glandular swelling about neck greatly increased. Now coughs but seldom, but when he coughs he coughs very hard, and the cough seems to cause an increase in size of neck. He raises very little. There is considerable tenderness over the puffy swelling above the indurated glands so that he holds his head tipped to the right side, and he has left off his collar. There is no change in the consistency of the glands. Temperature 100.6° F. Pulse 96.

Because of the advance of his father's case and of his imminent death, it was thought best to remove the patient from his home. Accordingly, on August 27th, he took a private room in St. Joseph's Hospital, and thereafter was under the daily observation of his physician.

On the day of his admission his morning temperature was 98.8°, pulse 102, respiration 32. The evening record gave temperature 101.8°, pulse 108, respiration 32. I was able to demonstrate that there was a most marked difference in the physical signs on the right side of the chest between the sitting and the recumbent positions. In the recumbent position breathing was difficult, there was little excursion of the right chest, and the breath and voice sounds were faint, if at all clearly heard. In the sitting position, breathing was easier, excursion of the right chest was greater, though less than that of the left, and the vesicular murmur was comparatively distinct, and the voice sounds approximated the normal. It was predicated upon these findings that there was a pressure on the right bronchus from enlarged lymph nodes which in the recumbent position practically excluded the entrance of air. It was also demonstrated that there was marked interference with the venous circulation, as indicated by the greatly distended superficial veins on the right side, and across the entire chest at the level of the xiphoid appendix, and also by the puffy swelling about the neck, which could only be accounted for by the over-distention of the cervical veins. This, too, was attributed to pressure upon the intra-thoracic veins.

The progress of the case from this time, as also up to this time, was from bad to worse. The enlargement of the glands about the front of the neck and within the thorax advanced, though the lymph nodes in other regions remained practically of the same size as when first observed. The intolerable itching of the skin and the various cutaneous lesions persisted to the end. The resulting sleeplessness and distress were pitiable, and only mitigated by codeine and hypnotics.

The temperature remained constantly above the normal. It was irregular. The usual daily range was between 101° and 102.5°, though it marked 103.2° on one or two occasions, and occasionally dropped below 101°, but never below 100°. The respiration was labored and unsatisfactory, and practically impossible except in the sitting position. There was a venous hue to his complexion. Though the respiration seldom rose above 32, this rate did not tell the story of his respiratory distress. The pulse was pretty constantly maintained at 120.

Repeated examinations of sputum and urine were made. The kdneys performed their functions accurately to the last. The sputum increased in amount as the evidence of interference with the pulmonary circulation increased, but in no examination were tubercle bacilli or other pathogenic forms discovered. In this unhappy plight he lived a few weeks, and died miserably from suffocation at 4:40 a. m., September 7, 1901.

The autopsy was made by Dr. Steensland, pathologist to the College of Medicine, and I read to you his report:

Body of a well-developed, rather poorly nourished man of more than average stature. Rigor mortis distinct. Liver mortis of dependent parts marked. Pupils dilated. No œdema.

*Peritoneal cavity.* Peritoneum smooth and glistening. Appendix normal. Mesenteric lymph nodes not enlarged. Lesser peritoneal cavity and pancreas normal. Gastric lymph nodes about cardiac orifice considerably enlarged.

*Thorax.* Pleural cavities each contain a large amount of clear, straw-

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*Thorax.* Pleural cavities each contain a large amount of clear, straw-

colored fluid. Pleural surfaces smooth and glistening. Slight fibrous adhesions at both apices. Pericardial cavity contains about 100 cubic centimeters of clear, straw-colored fluid. Pericardial surfaces smooth and glistening.

General enlargement of lymph nodes of neck and thorax. This is especially marked around the great vessels at base of heart. Here the mediastinal and bronchial lymph nodes are matted together in a mass that almost girdles the great vessels, trachea and œsophagus, the girdle being deficient only posterior to the œsophagus. The cervical nodes, including the two lateral lobes of the thyroid, are considerably enlarged. The mass of lymph nodes, including the organs of the neck, weighs 1,380 grammes. Greatest circumference at upper limit of pericardium, forty-one centimeters, anteroposterior diameter fourteen centimeters, lateral diameter twelve centimeters.

Heart: Weight 260 grams. Valves and cavities normal. Lungs: Pink and downy. On section same color presented. Bronchial lymph nodes much enlarged and hard. Spleen: Weight, ninety grams. Pale, soft. On section pale. Pancreas normal. Liver: Weight, 1,800 grams. Smooth, brownish red, normal consistency. On section same color presented. Lobules distinct. Gall bladder contains small amount of normal-appearing bile. Mucosa pale. Kidneys: Weight, 290 grams. Capsule strips readily. Smooth. Cortex five to six millimeters thick. Markings distinct. Adrenals normal. Bladder: Mucosa pale. Genital organs: Tubules of testicles readily teased out. Epididymes, vasa deferentia and prostate normal. Aorta: Intima presents a few yellowish patches, the largest about four millimeters in diameter. Organs of neck: Mucosa of œsophagus pale. Tongue and larnyx apparently normal. Mucosa of trachea reddish. Each lobe of thyroid five centimeters long.

*Anatomical diagnosis.* Lymphatic Pseudo-leukæmia. Lymph nodes involved as disclosed in course of this examination: mediastinal, cervical, bronchial, gastric. Hydrothorax. Chronic adhesive pleuritis. Fatty degeneration of intima of aorta.

*Microscopical examination.* Section of blood clot from heart shows no apparent increase of lymphocytes, thus excluding lymphatic leukæmia. Thyroid normal. Mediastinal lymph nodes show proliferation of lymphoid and connective tissue elements.

Repeated examinations of the sputum were made during life and in the examination of the fluids and tissues after death, particular care was exercised to discover tuberculosis if present. In no examination of sputum, fluid or tissue was any evidence of a tubercular lesion discovered. On the other hand the microscopic examination of the lymph nodes showed the characteristics peculiar to lympho-sarcoma.

# XIX. GOITRE, MEDICAL AND SURGICAL TREATMENT

By THOMAS P. SCULLY, M. D.
ROME

It is not that I have anything original to offer that I present this paper to this society, but that I may contribute to the literature on the subject my experience in the treatment of goitre from the medical and surgical standpoint. During the past seventeen years I have treated eighty-three cases, not a large number to draw conclusions from, to be sure, but quite a number to have seen and treated in a territory where it is claimed goitre is not very prevalent, viz: Central New York state. Of the above number I have had an opportunity to use many different forms of treatments with varying results. In these cases there have been used the various remedies recommended by various writers for the cure of goitre from iodin in its different forms internally and externally to mercury and adrenalin, and it was the results of the treatment in the above cases that suggested this paper.

The unsatisfactory result of any one line of treatment in goitre has, without doubt, been the reason for so many remedies being suggested. Anyone who has had many cases of goitre to treat medicinally will have very unsatisfactory results in a large percentage of his cases. This is due chiefly to lack of sufficient discrimination. As illustration take the case of enlarged necks that one sees in young girls at or about the age of puberty. The family physician consulted regarding this condition nine times out of ten will suggest that the neck be painted with iodin; and in due time the tumor or swelling disappears and the iodin receives credit for its disappearance. Consulted regarding a goitre in an adult he suggests the use of iodin again; if it is a miasmatic bronchocele, it will usually disappear by the iodin treatment internally, but if the tumor has been present for a year or more this treatment will generally be disappointing, as will almost any other medical treatment. It is only in the myasmatic enlargements of the thyroid glands that in my opinion the favorable results reported from time to time by remedies administered internally or applied locally, have been produced, not in cases of solid or cystic adenoma of the thyroid. Likewise, in the use of parenchymatous injections of iodin, carbolic acid and ergot, it is only in suitable cases that any benefit is derived, and I have reason to believe that it is the same class of cases that have been reported cured or benefited by internal remedies in

which parenchymatous injections are successful. Electrolysis is curative in some cases without a doubt, particularly when the growth is comparatively small, as in the early stages of development or when the bronchocele is smooth and soft to the touch, the so-called follicular variety. In the cystic or solid adenoma it will not only fail of curing but will be harmful.

Without describing in detail the pathological changes that take place in the thyroid glands under their varied nomenclature of the text books, I would suggest that it be determined as nearly as possible whether the enlargement be of the parenchymatous, cystic, fibrous, hæmorrhagic, or exophthalmic variety for the reason that on the correct diagnosis of nature of the growth depends the success of the treatment. The parenchymatous goitre is the common goitre and is found chiefly in youth, between the age of twelve and sixteen. It is nearly always bilateral, usually preserving the shape of the glands in its normal condition, and it is soft to the touch. It is seldom that a parenchymatous goitre commences after the age of thirty-five. The cystic goitre is also soft, but presents in certain portions distinct fluctuation, and in some cases the fluctuations may be detected throughout the whole enlargement. The cystic goitre is probably the most common form of goitre found in adults. The fibrous enlargement will be recognized by its knotty, hard appearance. Hæmorrhagic goitre is found in middle age and elderly people and the name hæmorrhagic has been given to this variety to designate a condition in which hæmorrhage has taken place either externally or into the surrounding tissues. Exophthalmic goitre, Basedow's or Grave's disease, is recognized by enlarged thyroid glands, rapidity of the heart with palpitation, and prominence and protrusion of eyeballs.

In referring to the literature on this subject the only conclusion one can come to is, as regards treatment by internal and local remedies including electricity, that whatever degree of success has been obtained, it has been in the parenchymatous, hæmorrhagic or exophthalmic forms of goitre. Summing up the various remedies used, iodin, mercury, ergot, carbolic acid, thyroiden, adrenaline and electricity, are the ones that have given the most satisfaction. Iodin in the form of tincture is practically useless applied locally, and is a great source of annoyance to many. It should be used internally if used at all. If in the form of potassium iodid, 5-20 grains, three times daily, should be used, gradually increasing the dose up to the point of tolerance, or until some impression on the growth has taken place. In anemic cases, syrup of iodid of iron may be used. Compound tincture of iodin in 4-6 drops three times daily, gradually increasing up to iodism and then begin

decreasing the dose, is to me the most satisfactory plan of treatment; I usually administer it in syrup. Mercury in the form of unguentum hydrarg., iodid, rubrum and lanoline; ung. hydrarg., iodin. rub., two drams, lanoline one ounce; an amount of this about the size of a pea should be rubbed in daily as long as it is borne. Of iodin injections much can be said for and against as is also the case of any remedy used in parenchymatous injections; the one great point to keep in mind is the complications that may arise after an injection of any remedy into the growth. Death has taken place shortly after in many instances, and in some cases in from one to several weeks after, prolonged suppuration. In no instance should a parenchymatous injection be used without having the neck thoroughly cleansed by the free use of soap and warm water, with alcohol and ether used after as in the case of preparation for any surgical procedure; needle and syringe should be sterilized. The fluid iodin, carbolic acid or ergotine, should be put in sterilized bottles, and then tightly corked. After the fluid has been injected and the needle withdrawn, the site of the injection should immediately be coated with iodoform collodion. It is only in the parenchymatous growth that tincture of iodin, or carbolic acid will be of any avail. Tincture of iodin, ten to thirty minims will be found to answer, and should be injected very slowly, after pushing needle in quickly, avoiding site of prominent blood vessels and nerves. Carbolic acid is used in the same manner as prescribed above for iodin, a five per cent. solution being used and ten to twenty minims the amount. I have used a combination of tr. iodin and carbolic acid, equal parts, with more satisfactory results than with either alone. Once a week will be quite sufficient to use the injection. Of course, each time an injection is used a new site should be selected. A great advantage in using carbolic acid in preference to iodin is that where carbolic acid is used there is far less pain succeeding the injection, than where iodin has been used; the pain following the injection of iodin is sometimes very excruciating and not confined to the region of the tumor, but may be felt in the eye, ear or teeth, and quite frequently shoots down the chest. Thyroid extract has not, in my hands, been very satisfactory. At first acting with considerable benefit and giving indication of producing a lasting benefit, after using it from six to twelve weeks the growth has remained stationary, and in one case in particular, after eight weeks the patient began having pains in the joints, elevation of temperature and dyspnœa, gradually ceasing on its suspension. I am using adrenaline in a hæmorrhagic case with some apparent improvement.

Electricity, as I have stated, is without doubt a valuable

adjunct to the physician in treating small parenchymatous goitre; and it is in this particular form of goitre that I believe electricity is most useful. Galvano-puncture is performed by introducing a negative needle which has been thoroughly cleansed and sterilized, as should also be the skin of the neck. Having selected the site of introduction, avoiding blood vessels, the needle should be inserted into the growth for one-third of an inch. The current should be moderately strong, fifteen to twenty milliamperes; the duration of current should be governed by the strength of the patient, and each sitting should not last more than twenty to thirty minutes, and an interval of two weeks will suffice. The positive pole should be supplied to nape of neck by means of a large, flat sponge electrode.

In exophthalmic goitre, the treatment by medicine has been very unsatisfactory in probably the great majority of cases. Various remedies have been recommended, but very few have been of any benefit. Digitalis, strophanthus, belladonna or atropine, aconite, gelsemium and veratrum viride have been used with varying success, few cases have been benefited, but I think none have been reported as cured. In anæmic cases, iron, quinine and small doses of strychnia given in conjunction with digitalis will be found to be very beneficial. For some time I have been using tincture of cratægus oxycantha (American Hawthorne) instead of digitalis or strophanthus with more satisfactory results. Electricity can be used with benefit more particularly in the subacute or chronic form of the disease. I find the faradic current answers well and I do not limit its application to the neck, but apply it to cardiac regions, the spine and epigastrium as well. The anode is placed along the spine or nape of the neck and the cathode on the goitre or cardiac region, also along the course of the pneumogastric nerve. A current should not be strong, two to four milliamperes not over ten minutes duration, and used once a day.

In the cystic and fibrous forms it is useless, in my opinion, to experiment with drugs or electricity, as it has been demonstrated beyond doubt that they will not be benefited to any great extent by these means. Then the surgical expedients are to be considered, and what has surgery to offer? Previous to the days of ether antiseptic surgery the surgical interference of thyroid goitre was not so satisfactory as it is at the present time, when the mortality of this operation has been reduced to one per cent. or less. Professor Kocher alone has operated on over 2,000 cases with only one per cent. of deaths. This list includes numerous exophthalmic and malignant cases. Berry, of London, reports 100 cases operated on by him with but one death, ninety-nine being reported

as cured. Several other surgeons report results equally flattering. The procedures now employed are ligature of the thyroid arteries; exothyropexy, division or resection of the thyroid isthmus; partial excision; enucleation and its modifications; resection, extirpation, complete excision. The surgeon is governed by the nature of the growth as to which method is best suited for each particular case. The cosmetic effects of an incision should always be borne in mind, particularly in young women, therefore, the incision leaving the least scar should be made in all cases, and the transverse incision with an upward convexity as practised by Professor Kocher, of Berne, Switzerland, is the one that should be made if possible. I will not give a description of the operations in detail as this has been gone into quite thoroughly by Berry, of London, in a recent edition by him on diseases of the thyroid glands; also in Bryant's surgery, last edition, and Professor Kocher's work on surgery. The question of local or general anæsthesia is one to be taken into consideration. Patients take considerable interest in this question and will submit more readily to an operation if they don't have to take an anæsthetic. Local anæsthesia is resorted to in all cases by Professor Kocher. It is far safer for the patient and more convenient for the surgeon to use local anæsthesia by cocaine or eucaine, hypodermically injected along the line of incision for the following reasons: 1st. If the patient suffers to any extent from dyspnœa, as is usually the case, the hypodermic of eucaine or cocaine does not increase the dyspnœa if given in small quantities; a one per cent. solution of cocaine or its equivalent of eucaine (eucaine having an advantage over cocaine in that it can be sterilized). 2nd. In all cases, and particularly where dyspnœa is present, the patient being conscious can inform the surgeon should he unduly press on the trachea, which, if already narrowed, the patient unconscious, might cause suffocation. In applying ligatures to the thyroid vessels in close proximity to the recurrent laryngeal nerve the nerve may be included, or in separating the growth from the trachea the recurrent laryngeal nerve may be injured; in either case, if the accident occurs, it will result in paralysis of the vocal cord of the corresponding side, and also alteration of voice. This can be avoided by the patient's assistance, while conscious, by simply asking him to speak at intervals during the operation. Professor Kocher informed me last fall while visiting him that he uses cocaine in all cases of goitre operations, and in the operations he performed while I was there he repeatedly asked the patient questions, satisfying himself that the recurrent laryngeal nerve was uninjured. The patient gave very little evidence of

suffering during the operation. A pleasing thing in connection with the cocaine anæsthesia is the absence of nausea, so frequently following general anæsthesia, which in goitre operations would be very likely to interfere with primary union. In conclusion I would say that surgery offers more encouragement for relief from this deformity, which causes untold suffering mentally and physically, than any other line of treatment, particularly in cases of long standing. The benefit is certainly accomplished in far shorter time and with decidedly less pain and discomfort.

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## XX. HUMAN ASYMMETRY

By WILLIAM S. ELY, M. D.

ROCHESTER

Organic nature furnishes nothing that is symmetrical. No leaf has its exact duplicate, no organ has its perfect counterpart, and no individual is constructed with absolute symmetry. The foot-rule, square and compass seem never to have been employed by the Divine Architect in the construction of the animal and vegetable kingdoms. We are so accustomed in the vegetable world to a lack of symmetry as at times to find that any suggestion of it is artificial, wanting in beauty, disappointing. This is especially true in the case of trees, and the occasional efforts of the French landscape gardeners to give symmetry to trees and shrubs only made them grotesque, and illustrated the absurdity of the undertaking. Some plants and flowers do, indeed, exhibit apparent symmetry, but on close study it is found not to be absolute. The higher animals are mainly built up of groups of organs more or less alike which combine in harmonious action and are generally supposed to have their corresponding parts symmetrical, but in man it is in appearance only, and on investigation by the artist or the physician the lack of symmetry is marked. The subject is so broad that we are compelled to limit our remarks to human asymmetry. Its facts are well known, but they have seldom been made the theme of an article for this society.

As a rule, the nearest approach to individual symmetry is in infancy, but with growth and environment and study and toil, all of which operate in different degrees upon the two sides of the body, there come asymmetries which by the time that growth is completed are fixed and permanent characters of the individual. Normal asymmetries are often supplemented by those that are pathological. Both have for the physician and

the surgeon great significance, at times aiding in the appreciation of disease and injuries, and their proper treatment.

Anatomically, asymmetry is apparent on slight study. The two sides of the head are seldom alike. This is the common knowledge of every hatter, and in injuries of the skull it is occasionally difficult to determine whether certain localized prominences or depressions are natural or the result of accident. The ears rarely correspond exactly in place, size and shape. The eyes are often unsymmetrical, and the irides at times contrast widely. From slight convergence or divergence of the eyes to pronounced squint, from approximate emmetropia to extreme ametropia there are many shades of lack of symmetry that should not be deemed pathological. The nostrils are not equally patent, and the turbinated bones may differ. Deviations of the nasal septum are common, do not invariably obstruct respiration, and are not always pathological. When we look into the mouth asymmetry is marked by irregularity of teeth, unless they be artificial, inequality of tonsils, dissimilarity of the right and left half of the uvula and tongue, and by other differences which the mirror of the laryngologist makes apparent. Remove the clothing from the chest and the lack of symmetry can be seen in unequal muscular fulness, fatty development, bony formation, circumferential measurement, and in tilting of the ensiform cartilage. The dressmaker is constantly obliged to pad the unsymmetrical busts of her patrons, as well as their other deforming disproportions, and she in turn, by the mandates of fashion, creates asymmetries of internal organs. In the arms asymmetry is exaggerated by right-handedness which enlarges the bones, thickens the muscles, changes the contour of the chest, and developes one upper extremity at the expense of the other. Looking from behind we find tendencies to spinal asymmetry before we reach well defined lateral curvature, lordosis, or beginning Pott's disease. There is asymmetry of the testicles and of the veins of the scrotum—the left testicle being, as a rule, the larger, and venous asymmetry favoring left varicocele. With pelvic asymmetry, which introduces a serious element in the progress of labor, the obstetrician is much concerned. The inequalities of the lower extremities are demonstrable by both longitudinal and circular measurements, and the feet, which are never alike by nature, have their asymmetries intensified by the boot-maker.

When we come to internal and concealed organs of the body our subject receives further illustration. If we admit that we have a double brain it is probable that its corresponding parts are unequally developed. Most of us have our best eye, and our

best ear, and are conscious that our motor activities and sensory impressions are a little more evolved on one side than on the other, and by many people it is admitted that when fatigued one leg leads and the other lags. Popularly the lungs are thought to be symmetrical. Anatomically we know that they are very unlike, and that the heart largely contributes to the differences which are to be noted in their size, shape, lobar divisions, weight and location. The heart itself is a very unsymmetrical organ. The kidneys may be said to be never symmetrical. Such azygous organs as the liver, spleen, uterus, prostate gland, have some lines of symmetry which disease often distorts. Arterial asymmetry is sometimes seen and often felt in the radials, making the pulses extremely unequal.

In disease we find that similar organs are either not both affected, or if affected, not in the same degree. Headache and earache are often onesided. Earwax may form in one or both ears. Disease of but one tonsil may be present. Neuralgia of one side of the face, and sciatica of one limb are common. While the selective action of many diseases can be easily explained, there are still numerous affections in which it remains a mystery.

We are frequently confused by what may be termed the asymmetry of symptoms. Pain that is present in one condition may be absent under conditions that seem similar. In fevers and inflammations the subjective and the objective symptoms are often said to be out of proportion to what we have read, or have seen, being in this sense unsymmetrical, and introducing an element of doubt and confusion in the minds of many consultants, thus making diagnosis obscure and prognosis difficult. Much has been written under different heads upon this phase of our subject, and more remains to be learned. The two lungs are seldom equally involved in any affection. In respiration the two sides of the chest may expand unequally or one side may not expand at all. Lagging respiration is sometimes noted as the only symptom in the beginning of pneumonia and pleurisy. Arterial sclerosis advances in different degrees in corresponding vessels, and asymmetry of pulse may come from injuries to the arm, aneurismal or other tumors of the chest cavity, emboli and autochthonous clots, or from compression of the subclavian artery (Vierordt). Asymmetrical movements of the eyes and of the pupils in disease may be of serious import and multiply diagnostic doubts. It is not yet determined to what extent in comparing the two sides of the chest slight relative differences obtained by inspection, palpation, measurement, auscultation and percussion may be considered within the range of normal asym-

metry. As no two individuals are alike, there is no exact standard of percussion note and auscultation sounds in health. Not only do healthy sounds differ in different individuals, but delicate shades of differences, due to relative asymmetries, exist in health in the same individual. The subjective element in the physician introduces another condition of variation, and the time must come when some more exact method of eliciting percussion sounds than that now practiced will be adopted.

Symptom asymmetry marks neurological conditions. As we do not know the nature of nervous force, we have to study its effects, which in disease of the nervous system are frequently emphasized by characteristic asymmetry. Slight atrophy or hypertrophy, impaired motion or sensation, absent, lessened or exaggerated reflexes become of great import in certain cases. There are paralyses of parts of the face and eyes and cheeks and tongue and lips which are so slight as to escape the untrained eye. There are degrees of ataxia, areas of altered sensibility and limitations of movement which the patient may not note, and the general practitioner may fail to discover, but by the accomplished neurologist they are co-ordinated to make a diagnosis of a definite and localized nervous lesion.

Much of the work of the orthopædic surgeon is in correcting deformities of early life, and in the majority of his cases the first symptoms were the slight pains or asymmetries of movements too often overlooked by the general practitioner, and not infrequently escaping the close observation of the interested mother or care-taker. It becomes us, therefore, in treating every child, to have it stripped on the initial visit, in order that we may study it, to detect any asymmetry of surface, or of muscular power and nervous action. Very soon it will be discreditable not to detect early some of those conditions which reach the orthopædic surgeon only when asymmetry is marked by a twisted spine, or shortened and atrophied member, or hip disease advanced to a well-nigh hopeless stage.

Through disregard of the laws of inheritance many of our patients are the products of unsymmetrical ancestry, inheriting unsymmetrical brains, disproportionate nervous systems, and are weighted for life with various asymmetries of which science can better take account than correct. The emotional, the hysterical, the eccentric, individual is decidedly unsymmetrical in his development, and much so-called genius suggests asymmetry. All those complex emotions which represent unbalanced action are just as much evidences of nervous asymmetry as are the gross appearances presented by atrophied or hypertrophied muscles indicative of muscular asymmetry, and the time will come

when, better than now, we can demonstrate the asymmetry of brain cells.

Numerous occupations have deforming tendencies. In early school life pupils are subjected to influences that favor asymmetrical development. The stoop of age is often prematurely acquired, and there are tasks which bend the body forward and anchylose the spine. The chronic weary and the heavy laden are always deformed. Some of our recreations have a similar effect. A prominent English writer deprecates tennis for English girls, and speaks of it as "that nasty game which is making our English girls lopsided, destroying their symmetry of form." This objection does not apply to many exercises. Horse-back riding in a manly way, skating, rowing, walking, running, cannot be said to favor one side of the body at the expense of the other side.

The questions which our subject suggests are more easily asked than answered. The profession is not in accord in distinguishing between normal and abnormal asymmetry. It is not yet agreed how far the right half of the brain should be educated. There are physicians in this room who could not distinguish with the left index finger between the cervix uteri and fæces in the rectum. In using the microscope there are others who would fail to identify a renal tube cast with the left eye, and some of us could not sign our names with our left hand, or count the pulse with our left fingers, or open an abscess properly if our right hand were disabled.

Is such asymmetry of training to be commended? Is left-handed aptness obtained at the loss of right-handed deftness? As man was not originally right-handed, should we be indifferent to the functional development of parts of the right brain now inactive?

Many phases of asymmetry tend to pathological results, and we should strenuously oppose those habits of dress, study, work, that are compressing, contracting, confining and disease producing.

An inference from the foregoing is that the general practitioner must be symmetrically educated and trained in order to be able to recognize asymmetrical conditions with pathological tendencies. To decide when the services of the specialist—the man who is supposed to know everything of something—are required, the family physician must know something of everything. There is, therefore, no danger that the time will ever come when the calling of the general practitioner will be less dignified or important than at present.

# XXI. THE EDUCATIONAL MANAGEMENT OF THE NEURASTHENIC

By EDWARD B. ANGELL, M. D.

ROCHESTER

In the course of a visit to the European clinics, this past summer, I was much impressed by the satisfactory results obtained in similar nervous troubles by different methods of treatment. For example, ataxia seemed to be equally benefited in the wards of the Charitè Hospital, at Berlin, by extension and warm baths, in the Moabit Hospital by Fränkel's methods of re-educating the muscles, or in Vienna by hydrotherapy and tenotomy, while at Nancy the same success seemed to follow the use of suggestion. When at Paris, I visited Bicêtre with Bourneville, and learned how much had been done with that most hopeless malady, idiocy, by patient, persistent educational methods alone, I was forced to the conviction, that in all treatment of nervous troubles education must play a more important part than is ordinarily believed. If this be true of organic degenerative changes, of how much greater value may education be in functional disorders of the nervous system. In hysteria and neurasthenia especially is it true that education plays an important rôle.

Whatever may be the pathologic conditions underlying these neuroses, from the standpoint of treatment the problem is quite as much psychologic as physiologic. I do not wish to underrate the importance of nutrition and drugs, but I do desire to emphasize the necessity of giving more attention to educational methods in dealing with these disorders. Fatigue or any depression of the nervous system primarily affects volition and judgment, the higher mental faculties. Their influence is restricted; while the lower forms of psychic phenomena, such as feeling and emotion, become unduly prominent in the field of consciousness. In the neurasthenic this exaltation of subjective feeling and emotion unduly influences the judgment and volition, but does not dominate them. In the hysteric, on the other hand, volition and judgment become subordinated and perverted, giving rise to that bizarre conduct which is so characteristic. The neurasthenic is unduly conscious of bodily impressions. His field of objective consciousness is restricted, but he himself is aware of the fault. Not so, however, with the hysteric, whose judgment and volition are absolutely controlled by his subjective feelings and emotions. In either condition, however, there is more or less a reversal of the field of consciousness, subjective

ideation replacing the normal objective action of the mind. Is it not true that the dominant symptoms of neurasthenia are exaggerated self-feeling, over-ready emotion, mental depression and limitation of the field of objective consciousness? In truth, the explanation of a large number of morbid phenomena can be readily found in this undue consciousness of impressions arising within the individual himself. Often, indeed, they are but exaggerated sensibility to bodily processes that are really normal in character. Recall the frequent complaints of a vague sense of discomfort in stomach and bowel which may accompany normal digestion; of the troublesome arterial pulsations; of the precordial distress and its correlated disturbance in the action of the heart; "fulness of the brain," etc. All these may exist under normal conditions, but they are wholly subconscious and only contribute to our sense of well-being—coenesthesia so called.

The treatment of the neurasthenic, then, must have for its aim the restoration of the normal relation between the conscious mind and its subjective conditions, and hence must be largely educational. To secure this it is of primary importance for the physician to acquire the absolute confidence of his patient in order to exercise authoritative control. Nothing is more conducive to this than a thorough examination with due consideration of all the patient suffers and believes. In so far as absolute methods of examination by instruments of precision can be employed, by so much the more does the patient become imbued with the belief that the physician thoroughly understands his condition. To him the strange, unusual feelings give birth to morbid fear and dire apprehension of disaster. It is the unknown not the serious that produces mental panic.

In dealing with the more serious phases of neurasthenia, and it is this class especially that I am discussing, removal from associations which stimulate subjective feelings and dominating emotions is all but imperative. Isolation, if possible with a strange nurse amidst unfamiliar surroundings, is of great importance. The subjection of these dominant feelings and their kindred emotions of perplexing doubt and assured despair, of that heterogeneous maze of bodily sensations so disturbing to the neurasthenic, must be systematically accomplished. Let the physician beware of giving undue attention to these phantasmagoria. No *ignis fatuus* will lead him a more fruitless chase. When once he is sure that they are of no real objective significance let him rather, by ignoring them or by reassurance, convince his patient that they are of no great importance. In the early stages of the treatment this can better be done by indirect suggestion than by any amount of rational argument. It must ever be remem-

bered that this disease depresses the activity of the rational faculties, thus rendering appeal to reason of little value. The manner, the assurance of the physician rather than his argument, on the one hand, and his ignoring of subjective symptoms, however important they may appear to the patient, on the other, yield most fruit. Later, ridicule may be employed for pruning the luxuriant growth of anomalous sensation, but ridicule is a two-edged sword and must be used with the severest wisdom. Isolation is further valuable in that it makes possible a daily routine, obedience to which is conducive to the re-establishment of a well-ordered mind. For this purpose I am in the habit of systematically arranging every hour of the patient's day—"charting my patient," as is happily expressed by Weir Mitchell, who, I believe, first called attention to its value. The very weakness of the patient's volition makes it easy for him to follow authoritative routine. Later a wider latitude may be allowed and self-direction encouraged.

Undoubtedly improvement in nutrition and increasing bodily weight play an important part in restoring the normal relations of the mind. But it is quite as much a psychic process as a physiologic one through the re-establishment of a sense of well-being. After an unvarying routine of five or six weeks your patient will be almost surprised when his early fears, feelings and convictions are recounted to him, so trivial will they now appear in his estimation.

Now is the time to use reason and to enforce authority. Explain carefully the nature of these disturbing feelings, the part they play in subjective consciousness and their real significance. Thus will be acquired a freedom from anxiety and later ability to repress their activity in consciousness. Frequently it may be necessary to replace morbid subjective feelings by real objective sensation. Nothing contributes more toward this than static electricity, cold douches or the wet pack.

The next step in the process requires your patient to do things in spite of attendant discomfort and depression. For example: exertion produces fatigue, but you insist upon the effort and with exercise of care in due time it is accomplished with ease. In this way the patient gains by positive effort, and gradually acquires normal control over the subjective symptoms which once dominated his mind. When once the patient realizes the significance of this, self-control has become established and he is convalescent. Now is the time to begin the final step in the cure—objective training. Direct the attention to the great world outside of self by reading, by study, by observation, by diversion, such as travel, pleasurable exercise, etc. The subjective

conditions must to a large extent modify consciousness, but should not control it, and when once your patient thoroughly understands the relation of feelings and emotion to judgment and volition he has acquired a mastery over self that is not easily destroyed.

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## XXII. TOXIC DOSAGE IN THE TREATMENT OF SOME NERVOUS DISORDERS

By WILLIAM C. KRAUSS, M. D.

BUFFALO

The unfavorable results generally obtained by the profession at large in the treatment of many nervous disorders I believe to be due to the inadequate administration of drugs and chemicals of known poisonous character. Minimum doses have been resorted to instead of the maximum, and the results are in direct ratio to the dosage employed. Consequently the treatment of nervous diseases is one chapter of neurology which has fallen far behind those especially on pathology and symptomatology. The general practitioner is apt to hold the neurologist more as a diagnostician, or neuropathologist, than a therapeutist, and only in extreme cases or very late in the course of a disease is he called into the case for consultation. It is well known that the success of many of the younger surgeons is due to their boldness and daring in difficult and dangerous conditions, and, although he sometimes treads where angels fear to follow, he many times snatches a life from an almost open grave.

If there is any opportunity for a bold therapeutist, it is in the domain of neurology, and his success will in many cases depend upon how closely he can hold his patient to the toxic line until the pathological process is dominated. I have been repeatedly called in consultation, found that the case had been correctly diagnosticated, proper treatment administered, but the patient either at a standstill or losing ground because of inadequacy of treatment, minimum dosage instead of maximum, or toxic, dosage being the cause of the retrogression. Pushing the same remedies to their full limit, sometimes to the dismay and consternation of the attending physician, would invariably produce results favorable to the patient and prove to be the turning point in the course of the disease. Especially has this been true in some cases of brain syphilis, perhaps cerebral gummata, where the symptoms of pressure would vanish quickly under the action of enormous doses of biniodide of mercury.

By toxic dosage I mean enough of any drug or chemical to produce distinct signs of intoxication; in other words, impregnating the system until it begins to rebel, such dosage to be eventually reached by a slow gradual process. Were such quantities to be prescribed abruptly, acute poisoning would follow, in most cases showing alarming symptoms or else terminating in death. To treat cases in this manner they must necessarily be watched very carefully, and the toxic symptoms of the drug prescribed be accurately known and instantly recognized. Each case being a law unto itself, no guide can be followed, no text-book consulted, the patient's vulnerability to the agent in question being the only index. The drugs to which I particularly have reference are mercury, arsenic, nux vomica, hyoscine, atropine and nitroglycerine—perhaps the most important agents in our special materia medica.

The dosage of hydrargyri chloridum corrosivum is given by many authors as from one-twentieth to one-tenth of a grain; the maximum dose, one-tenth grain, has no perceptible effect in advanced brain syphilis, gummata or meningo-encephalitis, and must be regarded as totally inefficient in these cases. Hypodermic injection of one to two grains daily of the corrosive sublimate may produce toxic symptoms, but the gummata melt away quickly in many cases under such medication. Although hypodermic injections of mercury have been losing in favor, I still believe that it is the only way to introduce mercury into the system when the nervous organization is affected. It acts more promptly, the danger of irritation to the skin and underlying nerves, as is often the rule with inunctions, is absent, and the degree of ptyalism seems to be more moderate than when given *per oram*.

Fowler's solution of arsenic in the treatment of chorea is still the favorite with the great mass of physicians. Text-books on materia medica give the dose of liquor potassii arsenitis as one to ten minims. One of our ablest authorities in speaking of the treatment of chorea says: "As specific remedies, arsenic heads the list. It should be given in doses of Mv of Fowler's solution t. i. d., increased by one or two drops daily to fifteen or twenty drops, or even more. I have carried some of these obstinate choreics along until they were taking from thirty to sixty minims t. i. d.—one patient going so far as to neglect counting the drops and simply filling the teaspoon, after each meal, with results, not toxic, but abortive. I have thus far failed to find the newer preparations of arsenic superior to the old.

Nux vomica is universally conceded to be one of the most valuable drugs in the treatment of lowered nerve vitality, such as

is so commonly present in neurasthenia. Its physiological action adapts it nicely for the many diverse disturbances met with in this disease, and yet in the majority of cases, prescribed according to officinal dosage, its effects are slow and uncertain on coming. Ten drops t. i. d. before or after meals, increased gradually to thirty or even more, t. i. d., will render far better service than the traditional ten drops t. i. d. In the treatment of neuralgic and neuritic troubles, no drug has been so satisfactory in my hands as nitroglycerin. In a paper read before this society in 1896 I reported a series of cases of sciatica successfully treated with nitroglycerin. I still continue using this drug in every case, and begin treatment by prescribing one-hundredth of a grain t. i. d., gradually increasing, if the pain does not subside, until the patient is receiving thirty to fifty tablets daily, or until the pain does cease. The only ill-effects thus far encountered are a throbbing headache, easily and quickly counteracted by the bromides, and increase in size of varicose veins about the legs. I have never seen varicose veins develop under this treatment, and when further dilatation of the veins begins treatment should be cut down or else discontinued.

Tolerance to nitroglycerin is easily acquired by some patients. Thus, Stewart[1] reports a case of chronic nephritis where, six months after the initial dose, the patient was taking fifty minims of a ten-per-cent. solution (five minims of pure nitroglycerin), four times daily, with less effect on the vascular tension than the initial dose of 1-100 of a grain.

Reading[2] narrates the case of a woman fifty-seven years old, suffering with chronic interstitial nephritis, who, less than one year after the initial dose of nitroglycerin, was taking one teaspoonful of the ten-per-cent. solution at each dose, this being equal to six grains of the pure drug.

My dosage compared to these two is insignificant, and the moral to be drawn is to increase the dose until the physiological effects are produced, even if enormous doses must be administered.

Aside from its antineuralgic qualities, it is a tonic, and it is reported that girls working in nitroglycerin factories become plump and rosy and are the pictures of health.

Atropine and hyoscine are two drugs of much repute in the treatment of spasmodic disorders of pure nerve origin. The ties about the face, spasmodic torticollis and other localized convulsive seizures at times succumb quickly to one or another of these two drugs. Some cases, however, are more obstinate and will not yield to the usually prescribed dosage and require heroic treatment. I have seen severe cases of chronic torticollis relieved

by hourly administration alternately of atropine sulphate, grain 1-100, and hyoscine hydrobromate, grain 1-200, continued for weeks and even months without producing any of the ill effects so commonly met with. Some of these spasmodic disorders are practically incurable, not even yielding to surgical interference, but before being declared as such should be subjected to heroic dosage. Any improvement in the severity of the spasm or intermittency of the attacks must be regarded as improvement and due to the efficacy of the drugs.

1. Therapeutic Gazette, September 15, 1893.
2. Therapeutic Gazette, May 15, 1893, p. 292.

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## XXIII. AN EPIDEMIC OF TYPHOID FEVER IN THE BACK WOODS OF MAINE

By E. F. BRUSH, M. D.
MOUNT VERNON

Up the St. John's river, in the State of Maine, there is in the midst of the wilderness a clearing with homes for six families. These people are isolated: the only way to the outer world is by canoe on the river. Out of their clearings no road leads, and the nearest highway and post office is thirty miles down the river. The principal occupation is farming. This settlement is practically in the lumbering region, so good prices are obtained for all products needed in logging camps. The St. John's river is 500 miles long and navigable for 160 miles. The settlement is about 300 miles from the mouth of the river. I give these data that it may be understood that the St. John's is a considerable river where it flows by this small hamlet.

In a canoe, with an Indian guide, I ascended the river in October, 1897. After paddling about forty miles from Connors, which is the nearest railroad station, I found the river making quite a sharp bend, and at the outer point of this elbow, on a slight promontory to the right, was situated the first house in the settlement. It is a substantial frame and log structure surrounded by a few farm buildings. Above it about 100 feet or so, a fair-sized stream empties into the river St. John's. In this house dwelt Ralph Willetts, his wife and seven children. A quarter of a mile above this Willetts homestead, and on the left, there was a small frame house built on the high river bank. This had been occupied by a man named Jackson, his wife and one boy. Nearly opposite, but a little further up, on the right-

hand side of the river there was a vacant house. Proceding a mile further up the river we reached the principal place in the settlement, quite a large frame house with extensive outbuildings. Here the original settler, Louis Castonia, a hunter and trapper, built his home over fifty years ago and lived there until a few years past, when he was drowned. The place was occupied during my visit by his widow and her son, with one housemaid and two farm laborers. The widow Castonia was really the queen of the settlement, all the other settlers being related to her by blood or marriage. Up the river about half a mile further, on the same side, a fair-sized, story and a half, well-built house sheltered the widow St. John and her two sons, one of whom had a wife and baby, and there was also a hired man on this farm. Directly opposite, on the left-hand side of the river, the river here being a quarter of a mile wide, on a steep hillside was a small log cabin containing two rooms with a low attic. In this shanty lived Eli Castonia, his wife and eight children; beyond this a wilderness with only two log cabins within the next forty miles. At this point, forty miles above Castonia, the river widens and is dotted with islands, and here three families live in a settlement called "Seven Islands." There are no dwellings beyond Seven Islands to the headwaters of the river.

Ralph Willetts, a fairly well-to-do man, works in the camps and on the river during the winter and spring, and attends to his farm during the summer. He has lived in this house by the river for over forty years. In the fall of '96 his family was composed of himself, wife and seven children, three boys and four girls. October 15, 1896, one of his boys, thirteen years old, sickened; according to the father's statement, "had headache, pain in the stomach, loose bowels; after one week he took to bed and remained there for eighteen days; during this time he had no regular sleep, was delirious, picking at the bed-clothes; mouth dry and dark colored; began to improve after this eighteen days' confinement to the bed; he had frequent nosebleed during convalescence and was well in about four weeks." November 5th a girl of fourteen sickened; same symptoms as boy except no nosebleed; sick about four weeks. November the 14th Mrs. Willetts, age forty-five, sickened; recovered in about four weeks; December 18th, Mr. Willetts and two boys, eight and ten years old, sickened; Mr. Willetts and eight-year-old boy were sick six weeks, and ten-year-old boy recovered in four weeks. January 20, 1897, a girl, eleven years old, was taken sick and died after eleven days' illness. After she had been sick six days she lost the power of speech and suffered great pain in the lower part of her abdomen. "She died from exhaustion caused by the pain,"

her father said. April 1st a girl, four years old, had a slight attack; in bed three weeks. A boy, two years old, escaped.

Here was a family of nine persons; eight of them were sick, and someone was ill in this house from October 15, 1896, to January 31, 1897, continuously. Then after two months without sickness another member of the family was taken down, but the youngest, a two-year-old boy, escaped. There was no other inhabitant of the Castonia community sick during these four and a half months. With one exception, no one in the vicinity visited the Willetts during this time, because they were all afraid of the fever. Only one of these eight patients was seen by a physician. When Mrs. Willetts sickened her husband went to St. Francis in a canoe and brought up a doctor. Mr. Willetts told me that the doctor was unable to say what the disease was; he left a bottle of medicine, charged $25 for his two days' time and was taken home. I made diligent inquiries for the source of contagion in the initial case in this family, and found that in the preceding spring, sometime in May, 1896, there had been a large crew of men driving logs down the river. Out of this crew nine were taken sick *after* they had passed the Willetts house. The sick men were conveyed to Little Black, the first settlement below Castonia. Five of them died. None of these men visited the Willetts house on their journey down the river. There had been some sickness in a logging camp sixty or seventy miles above the Castonia settlement during the winter of 1895-96. Some of the sick men had been sent home by teams on the ice. No one had died in the camp and no one at Castonia could tell me what had become of those who were taken home during the winter. The sickness in the camp was called "the fever," and it was variously accounted for by the camp crew, some saying it was due to the drinking water which was taken from a swamp near the camp; others laid the cause to bad pork; and again others to some whiskey that had been taken into camp from Seven Islands. This whiskey was conveyed in an old keg that had been out in the fields all summer, and it was thought by them that snakes and lizzards and other such things had left the keg poisonous, so we can only surmise that the first case in the Willetts family came from some flotsam that the boy may have got from the main river when bathing.

At the Willetts house there was no privy; in fact, there is not one in the settlement. The water used in the Willetts house is taken from the brook that empties into the river about one hundred feet from the house. It is carried to the house in pails. In the kitchen there is a barrel which is kept full of water and used for all domestic purposes. This barrel is filled every morn-

ing and never cleaned. A long dipper hangs above it; everyone drinks with this dipper and throws back into the barrel whatever water is left after thrist is quenched. All the sick and well get their drink from this barrel. All the slops are thrown out of the kitchen door; the calls of nature are attended to around the corner, behind the buildings or anywhere that is convenient at the time, but there was no possible way that the surface washings from around the house could get into the water at the place where the Willetts get their supply to fill the kitchen barrel, or anywhere else into the brook. All the surface drainage from around the house washes into the main river a considerable distance below the mouth of the brook, and the Willetts never get water from the river, because the brook is handier and the water better. There is no probable way that the brook could be contaminated, because it flows through an untrodden wilderness, so fecal contamination here seemed to be impossible.

In January, when the Willetts girl died, Mrs. Jackson, who lived in the next house across the river, went to the Willetts to help the dead child's mother. She was there only a few days, and went home; she sickened in February, 1897, about four weeks after she had visited the Willetts. I could not get the exact date, as the Jacksons had moved away from this settlement after their recovery; but about one month later I got this information from Eli Castonia, that is, in March, Mr. Jackson and their only child, a ten-year-old boy, were both attacked at the same time. As Mrs. Jackson had not entirely recovered when her husband and son sickened, the three were sick together, and Eli Castonia came down the river to help the Jacksons. These people had a kitchen barrel the same as the Willetts, only their barrel was filled from the river. The same conditions as to slops, etc., existed at this house, except that it was possible for surface washings from around this building to get into the river at the point where they got their water, but the river here was deep and swift flowing. Eli Castonia stayed at the Jackson house a few days only. He went home and was taken sick with "the fever" on April the 12th; was sick about seven weeks. Then two months later, June 14th, one of his girls, two years old, sickened; June 18th a girl of sixteen was attacked; July 21st a girl of six sickened; August 10th Mrs. Castonia, who was nursing a six-months'-old baby, was taken severely ill and was sick seven weeks. August 27th a boy of ten took the malady; September 17th a girl of nineteen was taken down; September 20th another girl, aged eight, had a severe attack, and on October 10th the baby, who was nursing when her mother sickened in August and had to be weaned in consequence, was taken sick.

This last member of the family had been sick fourteen days when I visited them on October 24th, 1897. From a careful examination, I was sure this child was suffering with typhoid fever. When the father was taken sick in April, a married daughter who lived down the river at St. Francis came up to see her father and help take care of him. She stayed until about the first of May, when she went home. She did not take the fever. Eli Castonia is the least thrifty member of the Castonia settlement. His occupation is hunting and trapping. His log habitation is a shanty of two small rooms. It is situated on the bank of the river about 300 feet back and fifty or sixty feet elevated above the St. John's. The end of the cabin is towards the river and it fronts on a deep gulch, which takes all the surface drainage from around the shanty, and the woods and lands above and beyond for a considerable distance. During wet times the bottom of this gully is the bed of a good-sized stream, but in dry times it is only marshy on its lower level. In this depression, about 100 feet back from the river and about three or four feet above the river level in dry times, water for the Eli Castonia house is taken from a bottomless pork barrel that has been sunk in the soft swamp in the middle of the bed of the gully. During the very driest times this barrel is always about half full, and no washings from around the Castonia house can possibly pass this barrel without going through it, as the only stream that flows past in dry times goes out through the bunghole in the middle of the barrel. When I saw this "spring," it was about half full of clear, nice-looking water, and this water had been used for all domestic purposes by the family since about the beginning of May. They did not have a kitchen barrel. The water was used from the pail in which it was carried to the house. This "spring" is not available when the river is high, because the water from the river backs up and fills the lower level of the gully, thus submerging the barrel, and the other conditions of the high water make it more convenient for the Castonias to get their water from the river above the outlet of the gully. None of the family after the father sickened until about four weeks after they commenced using the water from the spring. The married daughter who did not get the fever, went away before the family commenced using the water from this barrel spring, and the baby, who was the last to get the disease, did not get water until after her mother sickened and she was weaned. From April to October all the washings from around the dwelling had gone down into the gully and so into the spring. Nine people had been sick, all slops and discharges had been thrown out of the front door, and so there must have been considerable

fecal contamination. When I visited this family they were still using water from the barrel in the gully, and everyone of them had a diarrhœa with abdominal pains and straw-colored fecal discharges. This ceased in a few days after they stopped using the spring water, during my visit.

This epidemic began with a boy thirteen years old. He had never been away from home; there was only one probable place where he could have gotten the typhoid contagion—the river—and still his folks did not use river water, while all the other people in the settlement did. It is almost certain that typhoid fever had existed in the logging camps on the banks of the river sixty or seventy miles above the boy's home, and the same disease had passed the house six months preceding the boy's illness. In the settlement where the sick men died in May, '96, there were no new cases of typhoid fever up to October, '97, thirteen months later, nor were there any cases anywhere else along the river. After the boy's illness, it was very easy to follow this water-borne contagion. Everyone who drank from the Willetts kitchen barrel after the boy was sick, except possibly a two-year-old child, had typhoid fever; this child was not tall enough to help himself from the barrel; he got milk and weak tea at meal times, and the father told me that he thought the baby did not drink any water during the fever time, which was the winter months; and the three who drank from the barrel in the Jackson kitchen after Mrs. Jackson went home, and took the same means of contaminating it that the Willetts boy did, took the same disease; and all who drank water from the Castonias' "barrel spring" had the fever.

Now the points of interest in these cases are: first, the contagion of typhoid fever was conveyed in the Willetts house by water without fecal pollution; second, there was no difference in the intensity of the contagion between the fecal contaminated and the mouth contaminated water; third, the continued use of the fecal contaminated water produced the same yellow-colored diarrhœa that characterizes typhoid fever, after the fever had subsided, and the mouth contaminated water had not this effect; fourth, the remarkable number of recoveries under such unfavorable environment; with none of the patients was any particular attention given to diet; there were neither baths nor medicine, and the Castonia sick had only the roughest kind of food, namely, flour, pork and beans. Fifth, the indefiniteness of the period of incubation; all those who took it first were attacked not earlier than about four weeks after exposure, and still some cases continued to use either the mouth or fecal polluted water for from two to six months before they sickened.

Sixth, the limitation of the disease—in these nineteen cases, uncomplicated by any kind of treatment, the disease lasted from three to seven weeks; the average, taking all the cases together, was four weeks. In the Willetts house, where the food was fair and plenty, the continued use of the polluted water did not continue the intestinal irritation, the recoveries were complete; but in the Castonia home, where the food was coarse and meagre and a diarrhœal condition was continued for months, there was marked emaciation, anemia and languor in those who had recovered from the fever, and one child in this family had œdema of the lower extremities.

The last case in this history, an infant six months old, did not apparently get the disease from his fever-stricken mother, whom he nursed until "the fever" dried up her milk. When the mother's milk was gone, he was fed flour gruel made with water from the typhoid fecal polluted spring, and all his drink came from the poisoned barrel, nevertheless, it took two months to inoculate him. Season apparently had no influence on the prevalence of the disease. It commenced with one case in October, '96; then two cases in November, '96; three cases December, '96; one case January, '97; one case February, '97; two cases March, '97; two cases April, '97; two cases June, '97; two cases July, '97; two cases August, '97; two cases September, '97; one case October, '97; thus the epidemic extended over one entire year and was very evenly distributed.

Two families out of the five in the Castonia settlement escaped "the fever," namely that of the widow Castonia, composed of five members, and the widow St. John's household, six people. All the water used by these two families was taken from the St. John's river: neither of these families had a privy; all the other conditions regarding the calls of nature and the disposal of slops were the same as that observed in the three homes where "the fever" was rife, but no member of either of these two families during the entire year had drunk any water from the Willetts or the Jackson kitchen barrels or the Eli Castonia "spring." "The fever" was not confined to one side of the river; the Willetts lived on the right-hand side going up and the Jacksons and Eli Castonia lived on the left. The two families who escaped lived on the same side of the river as the family where the fever started.

# XXIV. THE TREATMENT OF PNEUMONIA

By REYNOLD WEBB WILCOX, M. D., LL. D.

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The treatment of pneumonia always possesses great interest for the physician, both because of its prevalence and of its high mortality. Any method of treatment which can reduce the latter is well worthy of our consideration. What the mortality really is can be roughly stated as that about one-fourth of all patients attacked die. The laity regard this disease as even more fatal. Actual statistics vary much, Wells, in an analysis of nearly a quarter of a million cases, determined a mortality of a trifle over eighteen per cent., the collective investigation of the British Medical Association twelve per cent., while of about forty thousand cases in the German army the fatality was less than four per cent. The significance of these figures lies chiefly in indicating the class of patients in which this disease is so fatal,—the alcoholic subjects, debilitated and especially old individuals. I think almost any collection of mortuary reports will show that at least one-fourth of all necropsies will reveal chronic interstitial renal disease. Death more commonly takes place from gradual toxæmia or mechanical interference with circulation or respiration; the last being a gradual exclusion of air by the filling up of the ultimate air spaces of the lungs and, as a consequence, compression of the capillaries. Another factor to be considered is the depressing effect of a great loss of blood serum if an extensive territory has been invaded by the disease. The dangers from the heart have always received attention at the hands of the clinician and digitalis and other cardiac remedies enter into most schemes for the treatment of pneumonia. For many years I have been impressed by the good effects obtained by the use of the nitrites in conjunction with strychnine, so ably advocated by Smith. The bleeding of the patient into his systemic arterial system by nitroglycerin or sodium nitrite and the stimulation of the heart by strychnine nitrate, the loudness of the pulmonic second sound being taken as a guide, has been of remarkable service in my hands. Of late erythrol tetranitrate, in dose of one-half grain, every four to six hours, gives more even and controllable effects than the evanescent nitroglycerin, or the uncertain sodium nitrite. Strychnine I employ hypodermatically as the nitrate in doses from one-sixtieth to one-fifteenth of a grain every four to six hours until I find the

pulse satisfactory. Alcohol is only given to alcoholic subjects, and then with a free hand. Ammonium carbonate in ten-grain doses in two ounces of milk, every two hours, replaces strychnine in the aged. I believe when we have employed these remedies with discretion and persistence, we have done the most to meet the mechanical conditions that is at present possible. I am aware of the excellent results claimed for and obtained by veratrum viride in the very early stages of the disease occurring in young or even middle-aged robust individuals. However, the period of the disease and the class of suitable patients are far too limited in metropolitan practice, to allow this to be considered as a proper routine treatment. I have seen brilliant successes and quite as often unfortunate results and only exceptionally would I employ it at the present time. Bleeding is mentioned chiefly in the hereditary text-books, and to it the same remarks, perhaps more stringently, will apply. It is also a notorious fact that bleeding does not give so good results in pneumonia as in cyanosis with dilated right heart due to other causes. This observation leads to the questioning as to how much the pressure in the pulmonary artery is raised by extensive pulmonary consolidation. Clinically, the method above outlined has improved our results. Experimentally, Welch showed that it is very difficult to raise this blood pressure unless extremely large areas of circulation were cut off. Quite recently Wood, Jr., has shown that various influences (among others, asphyxia,) elevate the blood pressure in the pulmonary artery, and this elevation is not a passive one. Experimentally, he shows that nitroglycerin and the other nitrites, while lowering the elevation of the aortic pressure, cause a slight elevation in the pulmonic system. Certainly, at present the results of experiments do not very closely tally with those of observation.

In addition to the statement made above as to the unsatisfactory results of venesection, it should be stated that the effect of the toxins on the cardio-respiratory centres and of pyrexia in the heart-muscle, must always be taken into consideration in discussing this difference, and this brings us to the matter of toxæmia. There is certainly a considerably percentage of instances where the demonstrated area of consolidation during life, and the evident amount of hepatized lung after death, are absolutely too small for any mechanical theory to account for the fatal issue. Here toxæmia must be the efficient cause, and both prognosis and treatment should be largely influenced by our knowledge and appreciation of it. Before the modern concept of toxæmia had become established, in fact, before the microbic theory of pneumonia had been postulated, calomel was a favorite

remedy. Later quinine, chloroform and salicylic acid had a certain established reputation. In spite of all, the death-rate, if we may judge from hospital statistics, compared by decades, did not sensibly change. So late as 1897, Osler believed that we had no reliable measures at our disposal to combat the toxæmia of pneumonia. Within two years, however, Corgier and Cassoute reported that after a continuous administration of fairly large doses of creosote carbonate (containing ninety-one per cent. of cresote and made from it by the action of nascent carbon dioxide) in most cases a typical fall of temperature occurred during the first twenty-four hours of treatment, and if the remedy was persisted in for a sufficiently long period of time, the apyrexia became permanent. Relapses and sequelæ, so frequently seen under other methods, were entirely absent. So positive an assertion could not escape attention. Creosote,—better beachwood creosote,—is not a new remedy, but its caustic action and its irritating action upon the kidneys when given in necessary amounts, had prevented its use. So pronounced were these untoward actions that I had abandoned its use in pulmonary tuberculosis several years earlier. The daily dose of creosote carbonate was from two to four drachms, the dose interval being six hours. So soon as the temperature reaches the normal the amount is reduced to one-half, and this is continued so long as auscultatory signs persist.

What are the results? Cassoute and Corgier reported favorably upon eighteen cases: Stokes, seven; Bridges, eight; Frieser, nine; Meitner, thirteen; Eberson, four; Van Zandt, sixteen; Von Ruck, twenty (complicating pulmonary tuberculosis); Weber, nine, and Thomson, eighteen cases. From these observations the statement of Van Zandt is fair, — that creosote carbonate cuts short or aborts a large percentage, mitigates almost all the rest, and in a small percentage of pneumonia there is no result. Certainly, if the early appearance of the crisis is any indication of the value of the treatment, this remedy merits a careful trial.

My own experience covers thirty-three patients, with no deaths. The disease terminated by lysis in nine; by crisis in twenty-four. Crisis occurred on the sixth day in one, seventh in two, eighth in nine, ninth in six, tenth in three, eleventh in two and on the twelfth day in one patient. In two patients above the age of seventy lysis occurred. Of three alcoholic subjects, in two lysis and in one crisis was noted. Two instances of double pneumonia both terminated by lysis; in one the infection of the two lobes was contemporaneous, in the other by sequence. Aside from the remarkable reduction of mortality, the increased per-

centage of cases in which crisis is noted is suggestive as to the true significance of that phenomenon, and is an argument for the value of the remedy in nullifying the bacterial activity and its results.

Of the accessory treatment, in addition to that with reference to the mechanical conditions, particular attention should be paid to the emunctories, in order that all avenues by which toxins can be eliminated, may be open. In patients suffering from renal disease of the interstitial variety, intestinal irrigations of a gallon of decinormal saline infusion, at a temperature of 108° F., practised twice daily through a rectal tube, is a most valuable method of provoking diuresis, stimulating the heart, and to a less extent producing diaphoresis. Naturally, it thoroughly cleanses the large intestine. Intestinal antisepsis, as advocated by Waugh,—one-sixth of a grain of calomel every hour for six doses, with saline laxatives enough to empty the bowels completely and keep them open afterwards with from three to six grains of zinc sulphocarbolate every two to four hours, at other times than the calomel and salines, until the stools are odorless, and then just enough to keep them so,—has been of frequent use and followed by marked benefit. It is true, however, that under the creosote treatment tympanites is rare, and the necessity for this remedy much lessened. Oxygen is of value if the respiratory surface is greatly decreased. It is, perhaps, at times used unnecessarily, but no harm results. In the earlier days of my practice cold applications to the surface were employed, but in recent years fever is held in less importance on the one hand, and cold water is now admitted to be a poor antipyretic on the other, so that these have been abandoned. As for diet, milk, diluted with lime water or vichy or peptonized or fermented, should be our main reliance.

The present status of the treatment of pneumonia is especially satisfactory when results are considered. To summarize: 1st, continuous, persistent and generous administration of creosote carbonate; 2d, careful adjustment of mechanical conditions; 3d, thorough evacuation of toxins by all possible ways; 4th, temporary supplemental oxygen by inhalation, and, 5th, liquid diet until physical signs disappear. To be avoided are antipyretics, opiates, ill-advised external applications and slowly acting heart remedies, as digitalis.

# XXV. THE SMALL-POX PROBLEM

By ERNEST WENDE, M. D.
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Connected with the problem of how best to treat small-pox, there is an unknown equation which cannot be resolved with algebraic accuracy. It is not capable of such evidence as relates to mathematics. For if we subject the question to a rigid investigation, we immediately perceive the immense difficulty of attaining such results as sanitary science can sanction and adopt. It is beset with perplexities on all sides, surrounded by conditions that are injurious, and results in issues that are dangerous, tending to interrupt the possibilities of relief.

The special obstacles confronting the investigator, and the most important data bearing upon the subject, are: 1—The extreme and continued ignorance of the public generally respecting the disease and the means capable of modifying and removing it, as well as in regard to vaccination; 2d—The injurious interference of anti-vaccination, Christian science and vaccinophobia, due to ignorance, dishonesty and insanity, and certain to disturb, obstruct and overwhelm the normal order of prevention and safety; 3d—Ignorance respecting the efficacy of isolation, quarantine and disinfection, or a lack of appreciation of their preventive value, also allowing the anxieties, wishes, hopes, fears or other natural emotions of the patient or his friends to be paramount; 4th—The misconceptions and misappreciations of the members of the medical profession of the importance of the principles advanced by sanitation, also the established fact that many are wonderfully slow in recognizing the real nature of the disease; 5th—The lack of uniformity in sanitary laws and the indifference shown by many authorities in their enforcement; 6th—The employment and countenance of physicians as health officers for political reasons who have obtained the reputation for greater activity and boldness through their very ignorance of the true character and indispensable requirements of sanitation. It is obvious, therefore, that to obtain a field wherein to try this question of "How best to treat small-pox" we must go beyond the limits of ordinary practice and a mere text-book training.

The first obstacle in the path of prophylaxis, impending the attainment of the truth in regard to this disease, lies in the circumstance that the masses are lamentably ignorant of the measures necessary for its prevention. Even the extent of ignorance prevalent among the better educated classes is some-

thing remarkable. Knowing absolutely nothing about the principles upon which the practice of vaccination is founded, they are recklessly and shamefully negligent in applying this inestimable method which gives immunity from small-pox. Just as a right education is a prevention of crime, and far cheaper than the machinery for its detection and punishment, so is vaccination a prevention of small-pox, and cheaper than the appliances for its cure.

However favorably the sanitarian may look on vaccination, the lay public fears certain dangers in connection with it. First, it apprehends the transmission of other diatheses, such as scrofula, tuberculosis, syphilis, gout, rheumatism and bovine diseases. Secondly, because difficult of comprehension, it is coolly disregarded. The means contemplated to convey more correct views of the relation of vaccination to small-pox will be facilitated, and the hands of the sanitarian strengthened, by educating the people concerning these prepossessions and prejudices. The community should be afforded opportunity to become acquainted with the usual or special causes operating to prevent the infection. The approach of an epidemic would then be at once known and could be speedily antagonized. The want of power to weed out the various ''antis'' and the deluded obstructionists is much to be lamented, as prophylaxis will cease to be empirical only when the proper amount of knowledge shall be fully obtained by the laity.

There is, perhaps, nothing that has so long kept in abeyance the point at issue, or has done so much to throw discredit on the idea of protection as connected with vaccination, as the opposition to compulsory measures. The fundamental evil of the energetic and meddling practice of the ''antis'' is that, while not possessing, in itself, any power of checking or mitigating the pathological processes, it interferes with Spencer's law of equal freedom. It is a game of bluff, the mischievous practice of the fanatic and demagogue, who is ever ready to utter the cry of infringement of personal liberty. In their blind devotion to a visionary hypothesis, they overlook the most positive means of preventing small-pox. Like the witches and impostors of old that have always held competition with physicians, they care nothing for the safety and health of the public, but are continually striving to induce it to swallow falsities for facts. Let those who oppose vaccination as an infringement of personal rights answer these questions: Why not rob, murder, or cause the lesser outrages of the ten commandments? Why enforce compulsory education and poor laws? The point need not be argued that as a necessary consequence of the existence of small-pox—since life, property

and liberty are indispensable to equal freedom—the State, in some form or another, should protect the health of its individual members. For one of the commonest and most imperious instincts of our nature impels us to avoid impending suffering and to seek escape from it if already upon us.

The sin of neglect is unpardonable, as the Lord has ordained exact laws for the selection of preventive measures to stay disease. The time has come to dispense with hypothesis and theory. In sanitation, the ultimate appeal must be to facts which true science has discovered, arranged, combined and rendered unanswerable. It is a merciful work to clear away the gross perversions of mock science, even when hid under the appearance of religion. As Dr. J. M. Toner so aptly puts it, "Parents and guardians have no more right to withhold or neglect to provide vaccination for the children under their protection than they have to jeopardize the lives of these helpless infants by not furnishing them with food and clothing. It is criminal to neglect either, as death may be the consequence; but the failure to provide protection against small-pox seems to be more maliciously wicked than to neglect either food or clothing, as the former may not only cause the death of the child but be the means of spreading disease and death among many others; while the evil which arises from the latter ceases with the death of the victim."

Another agency that adds to the dissemination of this loathsome disease is that of the careless practitioner and incompetent health officer who are frequently called upon to diagnose some suspicious skin manifestation, which may or may not have caused sudden alarm in the community, to decide whether the apprehension of danger be well or ill founded, and whether the affection is or is not small-pox. It is not too much to say that a professional reputation is at stake, for it may be seriously marred if subsequent events prove such an opinion to have been inaccurate.

Again, errors are constantly committed by medical men in coming to their conclusions, as the ordinary mind cannot rise above its limitations. Thus we have ignorant, reckless and dishonest practitioners who, from one cause or another, such as inexperience, indolence, indifference, or deception, place a false value upon things of life in their attitude toward the seriousness of the matter in hand.

Further to increase disastrous blunders of this class, one needs only to include a disqualified health official who, perhaps, from a sympathetic interest in their short-comings, has been inaugurated into office through the avenues of patronage. It would appear, from the number of cases of small-pox universally prevalent throughout this country, that an instructor on sanitation ought

to be sent among this class to open the way to medical civilization. I believe that the prevention of contagious diseases can only be brought about through the conclusions of a long and careful experience, directed and enlightened by an independent spirit, and held in check by that philosophical scepticism which is so rare, but is essential to all correct scientific investigation.

Another difficulty connected with this question is the lack of qualifications in our health officials, which certainly are not always commensurate with their duties and responsibilities. The most obvious cause leading to this result is this: the defect existing in almost all of our medical schools in having no distinct chair for instruction in sanitary science, and the consequent neglect of it, or the very inadequate attention given to it by the professors in some other department in whose courses alone any consideration of it could be expected. The establishment of such a chair in every university, college and high school is a crying necessity. Sanitary knowledge, if instilled into the mind in the early part of the student's career, would act as a perpetual and ever-ready help to clear up many of the greatest obscurities of sanitation and enable him to avoid much of the deceptive logic and many of the false conclusions which are inseparable from ignorance of premises essential to diagnostic investigation. Without such instruction in his early progress as would enable him to find the right way, it is no wonder that his subsequent career should be beset by doubt and error.

The legitimate vocation of the physician is to mitigate or cure diseases; that of the sanitarian is to prevent them. The comparative power of the former with the latter to save life appears to be very circumscribed. The practitioner, possessing no other means of combating diseases but the feeble and uncertain armory of drugs, must look up for consolation, in his difficulties, in his blind groping, and amid the insignificant or dubious results of his labors, to sanitation. It should be a comfort for him to know with certainty that any disease that is communicable is preventable. It leaves no room for doubt as to its vast powers, or as to the incalculable good worked by these in the cause of humanity. The advent of such a desirable revolution as the establishing of a department of preventive medicine is clearly indicated, and the question is destined through its very indispensability to receive proper consideration in the near future.

It should be made indispensable that health officers qualify by a course of study in sanitation before being eligible to office. The necessity of such a course is apparent, for, owing to the want of proper qualifications in these officials who furnish the vital statistics which incite and direct sanitary activity, much

has been left undone and much accomplished that has not been creditable. The privilege of naming the health officer, and of selecting his subordinates should be denied the political boss. The selection should be guided by knowledge—not by ignorance—such as contemplates a reduction in the death-rate of preventable diseases, and always keeps in view the comfort and happiness of society. The health official should find, moreover, a perennial and lively stimulus to exertion in the hope that the time may yet come when the epidemic visitations of such diseases as small-pox, typhoid fever, cholera, and pestilential diseases in general, shall become a matter of history. Such consummation is, no doubt, remote, but it is no less sure. The diagnosis of well-developed small-pox is not necessarily difficult, but in an epidemic where the variolous contagion presents itself in such a variety of forms, only a few of which are remarkable for their severity, while the majority are noted for their exceeding mildness, it is not strange that mistakes have hitherto been made. It is impossible to give an absolute opinion before the appearance of the eruption, and even at the first appearance of the papules, and no one should be blamed for being in doubt as to whether he has to deal with a papular erythema or a papular form of measles. Epidemics that are featured by intermediate forms have not been of common occurrence. With mildness of prodromes, scarcity of eruption, and the appearance of the disease in successive crops, with brevity of duration and a lack of distinctness in the characteristic developments, a likeness to chicken-pox is presented that demands cautious and conservative procedure in diagnosis.

Instability and variation have been characteristics of the present epidemic, in contradistinction to the fixedness and permanency of previous ones. With these difficulties before the physician, only conversant with small-pox through text-book description, it is not to be wondered at that serious errors have occurred. We may state from observations that have not been limited to characteristic cases, that the distinctions to be noted are not as to the phenomena of the whole, but particularly as to mode and degree of expression. For the purpose of fixing with certainty the points of differential diagnosis, and, in an equal degree, to determine a principle of treatment, the physician should endeavor to show not only the dissimilarity existing between these two morbid affections of the skin, but their analogy as well. Recently, the inexperienced have frequently mistaken the vesicular summit of the small-pox papule in its slow growth, prompt suppuration and fibroid degeneration, for the true vesicle of chicken-pox which necessitates no such nice obser-

vation. It is not of a doubtful appearance, its superficial seat and transparency are perfectly appreciable to the eye, requiring no rigid examination, no exploration of the needle or lens. The careless have overlooked the fact that an epidemic eruptive disease attacking children and adults alike cannot be chicken-pox. After the prompt recognition and bold announcement of infection from small-pox should come our ability to cope with it practically and successfully.

It is evident that success in this matter necessarily depends on an enlightened system of isolation, quarantine and disinfection, based upon a thorough understanding of the origin and transmission of the disease, the duration of isolation and quarantine to be regulated by the period of incubation and the period of infection. The enforcement of these regulations should be accomplished by members of the police department rather than doctors or sanitary inspectors. The orders should emanate from a central authority, and their execution should be prompt.

Isolation, to be effective in ordinary circumstances, cannot be accomplished at home, owing to the reluctance of the afflicted families to maintain it. To prevent its spread to other individuals, or to the community generally, the patient should, therefore, be immediately removed to a suitable hospital, no distinction being made between pauper and non-pauper cases. As, mainly from ignorance and superstition, a large portion of the afflicted population refuse to enter a hospital, or to be vaccinated or isolated, such objections must be promptly grappled with by the strong hand of civil law. The saving of life in case of the decisive execution of proper sanitary laws would not only materially modify our tables of mortality, but benignantly affect the fortunes of nations. In order to secure the full benefit from isolation, it is necessary to impose a period of quarantine, regulated by the duration of the incubation stage, in case of all those previously coming in contact with the affected person. It is obvious that, unless this precaution is observed, the object aimed at, namely, the stamping out of the disease, may be defeated, for others may already have contracted it, by whom the poison may be disseminated broadcast. Of the potency of quarantine to strike at the root of this troublesome malady, and thereby to save life without the penalty of previous suffering, there can be no doubt. If the attention of society were fully given to the subject, an ample compensation for all labor attending investigation would be found in the proportionate development of the preventive department of medicine.

Of course, to carry out the hygienic processes to their possible and practical extent we must likewise disinfect. The fol-

lowing are the essential conditions of a true disinfectant: 1st—That it shall be capable of killing germs and their spores; 2d—That it shall be applied to every part; 3d—In sufficient strength; 4th—For a sufficient time. These conditions have been established by experiment—the only safe method of arriving at a conclusion—and until all are complied with the danger is not averted. In the treatment of small-pox, vaccination, isolation, quarantine and disinfection must always be admitted to exhibit the least equivocal successes and to assume the most splendid triumphs of the medical art.

How best to secure protection from the ravages of small-pox, or any pestilential disease, must continue for some time to come to engage the attention not only of sanitarians but of medical men throughout the country. The rapid progress which popular sanitation is making in some of the States of the Union is a subject for hearty congratulation among ourselves and a cause for devout gratitude to Heaven. The tendency of the times, necessitated by the testimony and experiences of history, is towards centralization, uniformity and simplicity. This is exemplified in national policy and commercial combinations. Interstate laws have been recognized necessary in fields too numerous to mention here, while the discussion of many others is constantly going on with the purpose of securing other benignant and effectual results. The one great need of the present time is the uniformity of laws relating to health, particularly to contagious disease. The rapid means of transit at the present day, the interstate and international commerce and travel which exist and will continue to increase, must necessarily, from the nature of things, lead to epidemic visitations of such violent diseases as cholera, yellow fever and small-pox, unless some organized system and well-recognized legal enactments are authoritatively interposed for general protection.

Sanitary laws, now beginning to be more properly interpreted by an enlightened public, testify to the fact that sanitary science has no country and comprehends no boundary—it is for the world at large. The difference in the requirements of the different States causes inefficiency, difficulty, expense, trouble and evasion. The most careful and protective laws and procedures in one section may be impaired most seriously by the reverse conditions existing in an adjacent state, county or city. With a uniform sanitary system and laws throughout the country, aggressive action could be maintained, the public educated, and the dire results of many epidemics avoided. How much more efficient in such a case would all our methods for the treatment of small-pox become, for, with varying requirements, indifferent

vaccination and lack of quarantine, isolation and disinfection, its management cannot be made either efficient or effective. There are thousands of persons among us whose once darkened minds have been so illuminated with wisdom on this subject as to beget an intolerable impatience under old imperfections. May their number increase until anything less than a uniform and universal sanitary code shall be impossible.

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## XXVI. RINGWORM: A NOTE ON ITS TREATMENT

By GEORGE THOMAS JACKSON, M. D.
NEW YORK CITY

Ringworm, like the poor, we have always with us. No matter where a doctor's work may lie, whether in the city or in the country, if he is in general practice he will, sooner or later, be called upon to treat ringworm. There are few diseases of the skin easier to cure than ringworm of the so-called non-hairy parts of the body. Sulphur, iodine, salicylic acid, mercury—any one of these in ointment or lotion will cure it. Indeed, most of them are not brought to the doctor, but cured by means of domestic remedies.

While it is easy to cure ringworm of the non-hairy parts, it is difficult to cure ringworm of the scalp and beard, especially the former. In many communities a case of ringworm of the scalp will float around from one doctor to another, and will persist in spite of their best endeavors. No conscientious physician will promise a speedy cure. If the patient is well in six months or a year the doctor can congratulate himself, upon his success.

To a certain extent this is true of ringworm of the beard, barber's itch. While by no means as intractable as ringworm of the scalp, still six months is often necessary for a cure under most methods of treatment. The reason for the intractability of ringworm of the scalp and beard is that the fungus grows down into the hair follicles, and it is very difficult to make our well-recognized antiparasitics penetrate to the seat of the trouble without damaging the skin.

It is not my intention to detail to you the many methods of treatment with which you are all more or less familiar, but to commend to you one that I have used for some years with excellent effect, and to ask you to give it a trial.

In looking for an excipient that would penetrate easily and be bland, goose grease occurred to me as probably just what I

wanted. Many of you have been brought up in the country, and remember how your mother used to rub your nose and throat when you had a cold with goose grease, in the belief that "it would loosen up the phlegm."

I have found it better than I had hoped for. If you will add a drachm or more of the crystals of iodine to the ounce of goose grease you will have a most effective remedy for ringworm.

At the Vanderbilt Clinic, New York City, where we have many cases of ringworm, this preparation has been used extensively for two or three years, almost exclusively after the first few months, when it was found to be more efficacious than other remedies. It is to be applied twice a day until it produces reaction, as shown by a little swelling of the patch. Then once a day will be sufficient. In two or three weeks the hair falls out of the patch and it becomes bald like a patch of alopecia areata. After a time the hair grows again and the patch is well. The first applications are apt to be a little painful for a few moments, but after that even little children do not complain of pain. No epilation is necessary.

When used on the bearded portions of the face the applications are more painful than when the scalp is the part treated. If much reaction with swelling is caused, the use of the remedy can be suspended for a few days and a salicylated oil of three-per-cent. strength can be used. As soon as the reaction subsides the remedy should be used again. The result in this form of ringworm is remarkable. A few days ago I asked Dr. Dade, who has charge of one of the classes for men at the Vanderbilt clinic, how long it took to cure barber's itch with the preparation. He said just three weeks, as he had noted in a number of cases. This coincides with the results I have had in private practice.

Just one word of caution. Be sure that you obtain the genuine article. I am told by those who should know that the goose grease dispensed by many druggists has never seen a goose, but is manufactured of several fats which, like goose grease, melt at a low temperature. There are some good samples on the market. The finest variety is expensive, as it is made from the fat of uncooked geese.

In those obstinate cases which iodine-goose-grease will not cure I have had excellent results from the use of an ointment of half a drachm of Croton oil to the ounce of sulphur ointment. It sets up a pustular dermatitis and causes the hair to fall out. Thus far the hair has eventually grown in and the cases have been cured.

# XXVII. THE TREATMENT OF SUPPURATION IN THE UTERINE APPENDAGES

By CHARLES P. NOBLE, M. D.
PHILADELPHIA, PA.

The treatment of pelvic suppuration in women is a subject which has been so much discussed during the past twenty years that one might well hesitate to bring it before you. My reason for doing so is that although the subject is old as a basis for discussion, it is one of the most important in gynecology. It is my purpose to report my entire experience in dealing with the varieties of suppuration in the uterine appendages, to give the results which have been secured by the several operations which have been practised, and to present the conclusions which I have drawn from this experience as a basis for discussion.

Cases of suppuration in the female pelvis can be advantageously divided into two classes: Circumscribed abscesses, as represented by pyosalpinx, abscess of the ovary, and puerperal phlegmon; and intraperitoneal collections of pus complicating suppurating disease of the uterine appendages. This report deals with 200 cases, 146 of which were treated by abdominal section, and fifty-four by incision and drainage, in almost all cases the avenue of approach being through the vagina.

Historically the operative procedures employed have passed through three periods of development. Prior to 1895 almost all patients were operated upon by abdominal section and the removal of the appendage or appendages involved. During this period drainage either with the glass tube or with gauze was freely resorted to. Later, when both appendages were involved, hysterectomy has been substituted in the great majority of cases for oöphorosalpingectomy; and the employment of drainage has been more and more restricted, until it is now used only in the worst cases.

During the era of hysterectomy there has been a growing tendency, which has become a fixed rule, to avoid abdominal section in all cases of large pelvic abscesses in which the disease of the uterine appendages is complicated by intraperitoneal abscesses. Such patients are treated by incision and drainage. The good results, remote as well as immediate, secured by this method, have led to the extension of the indication for vaginal incision to circumscribed pus collections when these can be easily reached, especially when of long standing, or if the patient comes under

observation during an acute attack. Vaginal hysterectomy has not been employed in cases of pelvic inflammation. The arguments of those claiming that this method offers advantages over the simple incision in the complicated cases, or over abdominal section in the typical cases of pelvic suppuration, have never seemed convincing.

The number of cases embraced in this report would be greater and the mortality would be higher if the cases of suppurating ovarian tumors and suppurating fibroids, with or without pyosalpinx as a complication, were included.

In looking back over fourteen years' work in this field it is gratifying to realize that our present methods give far better results both immediate and remote than those in use in the first half of this period. Prior to 1895 the mortality in fifty-five cases was 16.3 per cent.; since the beginning of 1895 the mortality in ninety-one cases has been 6.5 per cent. in patients treated by abdominal section. If to these are added fifty-four patients treated by incision and drainage, the mortality has been reduced to 4.8 per cent. This very substantial reduction in mortality by no means represents the entire gain which has been secured by changes in technic. With the improvements in technic the necessity for abdominal drainage has been almost entirely eliminated. The avoidance of drainage and the employment of an improved technic in closing the abdominal wound have reduced the occurrence of postoperative hernia from upwards of ten per cent. to a fraction of one per cent. The substitution of sterile catgut ligatures for silk has eliminated the occurrence of pedicle ligature abscesses from the list of sequels, together with the adhesions and sinuses which formerly gave great annoyance in a not inconsiderable percentage of cases.

From the standpoint of the patient, one of the greatest gains has been in the marked lessening of the percentage suffering from postoperative pain from adhesions, inflammatory exudate and pedicle abscesses. This group of complications in former years was sufficiently common to substantially lessen the benefits otherwise secured from operation in pelvic inflammatory cases. At the present time such complications are rare, and cases requiring the reopening of the abdomen to relieve pain due to adhesions and pedicle abscesses have practically disappeared from practice.

In order to bring the subject before you in proper shape for discussion it will be best to consider seriatim operation in the various types of cases by the different methods under consideration.

*Operation for Pyosalpinx or Abscess of the Ovary Complicated by Intraperitoneal Abscess.*—Twenty-six patients belonging

to this group have been operated upon, with seven deaths, or about twenty-seven per cent. In four of these patients hysterectomy has been done, with two deaths; and in twenty-one patients one or both uterine appendages have been removed, with five deaths. A mortality of twenty-seven per cent. is too great to be accepted in any operation, if by any means it is possible to secure better results. For this reason simple drainage has been substituted for radical operation in this class of cases, with the result of reducing the primary mortality to less than two per cent. The ultimate results secured by this method will be discussed under its proper head.

Experience in operating upon this class of patients by the two methods has convinced me that the radical abdominal operation should be abandoned and simple drainage substituted. The objections to the radical abdominal operation, either the removal of the appendages or hysterectomy, are: first, the high primary mortality; and second, the numerous sequels which are apt to follow radical operation in this particular group. As the pus is not contained in an abscess sac it is impossible to remove the wall of the abscess, so that a pus secreting membrane must be left within the peritoneal cavity, which necessitates the employment of drainage, and usually a large gauze drain. If drainage by the abdominal route is practised, the result in a large percentage of cases is postoperative hernia. Owing to the conditions present and the use of drainage, postoperative adhesions are inevitable, and in a considerable percentage of cases give rise to pain, and may require subsequent operation. Owing to the infiltration of the bowel, fecal fistula is a common complication of radical operation in this group of cases. If a radical operation is attempted for pyosalpinx complicated by intraperitoneal pus, especially during the course of an acute peritonitis, all of the pelvic organs are so infiltrated with inflammatory lymph that almost inevitably both appendages are removed. Especially in cases of abscess of puerperal origin one or both appendages can be saved if a drainage operation instead of a radical operation is performed. Of the fourteen patients in whom a subsequent abdominal section was performed out of the fifty-four patients in whom incision and drainage were practised, in only three was it necessary to remove both uterine appendages. For all these reasons the radical operation is to be condemned and simple drainage substituted. To this change in practice more than to anything else is due the fact that the mortality from abdominal section in the entire group of pus cases has been reduced from 16.3 per cent. to 6.5 per cent. in the last seven years, as compared with the preceding seven; and

that the mortality in the total number of cases in the last seven years has been reduced to 4.8 per cent.

When through an error in diagnosis the abdomen is opened in a patient belonging to this group, if conditions permit, it is best to abandon the abdominal operation and resort to vaginal drainage. To make this feasible it is necessary to have a well-trained assistant, who can keep himself clean and close up the abdomen after the drainage operation has been completed. If this is not feasible, it may be better simply to make drainage from above and leave the diseased tube or ovary for a subsequent radical operation rather than to attempt its removal when the patient is reduced by sepsis and fever, and when the entire pelvis is infiltrated with inflammatory exudate. The careful evacuation of the abscesses and a well-placed drain, protecting the general peritoneal cavity, will save a far larger percentage of such patients than a radical operation.

*Operation for Pyosalpinx or Abscess of the Ovary, the Pus being Confined to the Tube or Ovary.*—In this group of cases 120 patients have been operated upon, with eight deaths, or 6.6 per cent. Of these, forty-six have been operated upon by hysterectomy, with one death, a mortality of 2.1 per cent.; and seventy-four by the removal of one or both uterine appendages, with seven deaths, a mortality of 9.4 per cent. The reasons for the markedly better results secured by hysterectomy as contrasted with those from the simple removal of the affected appendages are easily understood by one who has practised both methods. To analyze these two groups of cases more closely: During the time that the forty-six hysterectomies were done, thirty-four patients have been operated upon with the removal of one or both appendages. In the patients in whom the uterus as well as the appendages were removed the mortality has been 2.1 per cent., and in those in whom one or both appendages were removed, leaving the uterus, the mortality has been 5.8 per cent. As the patients were operated upon during the same period of time it cannot be alleged that a growing operative experience is the explanation of the improved results in the hysterectomy cases. Moreover, as a matter of fact, the group of cases in which hysterectomy was done was of a more serious nature than that in which the appendages alone were removed, because whereas in the first group both appendages were involved in all cases, in the group of thirty-four cases in only half of them was it necessary to remove both appendages.

The conditions under which it is preferable to remove the appendages rather than to do a hysterectomy have usually to do with the anæsthetization of the patient. Full anæsthesia and

quiet respiration are very desirable for the performance of hysterectomy, whereas the appendages can be removed with the patient only partly under anæsthesia. When, as sometimes happens, it is difficult or dangerous to fully anæsthetize a patient, this fact may decide the choice against hysterectomy.

The manifest advantages of hysterectomy over salpingooöphorectomy are: (1) Hæmorrhage is better controlled, as the main trunks of the ovarian and uterine arteries are ligated. This very greatly lessens the tendency to oozing hæmorrhage from torn adhesions. (2) The pelvis is left in a very much more healthy condition, because the peritoneum from the anterior face of the broad ligaments and the bladder peritoneum, which is almost invariably normal, can be drawn over and sutured upon the raw areas upon the posterior surfaces of the broad ligaments and floor of the pelvis. Such raw surfaces are inevitable, because of the separation of the diseased appendages. A much better inspection of the pelvis is afforded at this stage of a hysterectomy than is possible at the conclusion of a salpingooöphorectomy; and isolated oozing points may be ligated, in this way avoiding postoperative collections of blood in the pelvis. By leaving the pelvis in better condition the occurrence of postoperative inflammation, masses of exudate and blood accumulations are much less common after hysterectomy than after salpingooöphorectomy.

In the group of cases of pyosalpinx and abscess of the ovary prior to 1895 drainage was employed in the great majority of cases, even though the pus sac was not ruptured in its removal. This was done on the ground that the case was suspicious from the standpoint of infection, and that the drainage was of service in removing blood from the torn adhesions. At the present time drainage is practically never employed in such cases, even though the pus sac is ruptured in its removal. Drainage is only indicated when the integrity of the bowel, bladder or ureter is open to suspicion, and in very rare cases in which the condition of the patient makes the arrest of oozing hæmorrhage from minute bleeding vessels hazardous because of the time consumed. The last indication is very rare in good hands. The ground on which drainage is omitted when pus sacs are ruptured is that if the peritoneum is left in a fairly normal condition it is better able to resist infection without than with drainage.

*Incision and Drainage for Pyosalpinx and Abscess of the Ovary when Complicated by Acute Peritonitis, or by Intraperitoneal Abscess. Incision and Drainage for Puerperal Phlegmon.*—The relatively high mortality of abdominal section for complicated cases of suppuration in the uterine appendages

has led to the employment of simple incision and drainage. This might be considered a reversion to the type of operation in vogue before the introduction of abdominal section for the cure of inflammatory disease of the uterine appendages. But this is only partly true. The old operation of aspiration and puncture for pelvic abscess was practised without an adequate knowledge of the pathology of pelvic suppuration, and the technic employed was so imperfect as to yield very poor results. Incision and drainage at the present time is practised with a full knowledge of the pathology of pelvic suppuration, and enlightened by this knowledge the surgeon is enabled to vary his technic so as to meet the indications for the thorough evacuation and drainage of the pus cavities in the different classes of cases presenting themselves.

Incision and drainage has been practised in fifty-four patients. In the great majority of the patients the incision has been made through the vault of the vagina, in a smaller number through the groin, and in some by a combination of the two incisions. The results obtained as nearly as can be ascertained are: Thirty-two have been cured, in fifteen there has been a partial failure, in six the ultimate result is unknown—that is, the patients have disappeared from observation—and in one case the patient died of heart clot immediately after operation. This patient was almost moribund when operated upon. By cured is meant that the patient has been restored to good health and no further operation has been required. By failure is meant that a subsequent operation for the removal of one or more of the appendages has been required. Most of these so-called failures have been in a very real sense brilliant successes, as the lives of the patients have been saved when in jeopardy and a cure has been made possible by subsequent abdominal section. The fourteen patients in whom a radical operation was performed at a subsequent date all made good recoveries from the secondary abdominal section, and in only three of them was it necessary to remove both appendages.* These facts are strong arguments in favor of simple

* Fourteen patients required a subsequent abdominal section as follows:

| | |
|---|---|
| Hysterorrhaphy | 1 |
| Unilateral salpingooöphorectomy with hysterorrhaphy | 1 |
| Unillateral salpingooöphorectomy | 8 |
| Hysterectomy | 3 |
| Ventral herniotomy | 1 |

The inclusion of eight of the fourteen patients operated upon by incision and drainage for pus may be questioned, as pus was not evacuated by the incision. These cases are as follows:

| | |
|---|---|
| Postoperative exudate, no pus | 4 |
| Ectopic pregnancy, no pus—acute nephritis | 1 |
| Hematocele, no pus—associated with cancer and phlebitis | 1 |
| Puerperal cellulitis, no pus | 2 |

incision in complicated pus cases, as the radical operation performed as a primary procedure would have had a very different mortality—not to speak of the thirty-two patients cured by the incision alone—and most of the patients would have lost both appendages.

The following is an analysis of the fifty-four cases in which the patients were treated by incision and drainage:

| Diagnosis. | Cases. | Cured. | Failed. | Unknown. | Died. |
|---|---|---|---|---|---|
| Postoperative exudate and inflammatory cyst | 4 | 2 | 0 | 2 | 0 |
| Ectopic pregnancy | 1 | 0 | 1 | 0 | 0 |
| Suppurating ectopic pregnancy | 3 | 2 | 1 | 0 | 0 |
| Suppurating ovarian cyst | 2 | 0 | 2 | 0 | 0 |
| Unclassified, including eleven pelvic abscesses of undetermined origin | 13 | 5 | 4 | 4 | 0 |
| Puerperal abscess and cellulitis | 22 | 15 | 6 | 0 | 1 |
| Gonorrhœal pelvic abscess | 9 | 8 | 1 | 0 | 0 |

Of the cases of hematocele from ectopic pregnancy in three suppuration was undoubted, and in one doubtful. In the doubtful case vaginal incision was practised because of acute nephritis. Of the four cases it was subsequently necessary to perform a radical abdominal operation in two, or fifty per cent. In one case a hydrosalpinx had developed, and in the other a tubal mole. This result is of interest as bearing upon the general question of the treatment of hematocele from ectopic pregnancy. The radical abdominal operation yields such uniformly good results in cases of hematocele as to make vaginal incision of doubtful value except in cases in which suppuration has occurred. In the two cases of suppurating ovarian cyst treated by vaginal incision and drainage, failure resulted. From the nature of the case this result was to be expected. Simple incision is only indicated in such cases when the condition of the patient forbids a resort to the radical operation. The unclassified cases consisted largely of abscesses in which it was difficult to determine whether they were of gonorrhœal or of puerperal origin.

Of the twenty-two cases of puerperal abscess and cellulitis, fifteen patients were cured; in six the operation was a failure, and one patient died. Two of the failures were counted twice, as each patient was operated upon once at home and once in the hospital. Puerperal phlegmon and puerperal ovarian abscess offer the best field for incision and drainage. A perfect cure can be effected in all such cases, with the preservation of all the organs of generation. This is also true of most cases of puerperal intraperitoneal abscesses, and many cases of acute puerperal suppurating salpingitis. Increasing experience strengthens the conviction that incision and drainage is the operation of

election for puerperal abscesses, and that abdominal section should be employed only in very exceptional cases.

Of the nine cases of gonorrhœal abscess eight patients were cured and one was a failure. This would indicate that the results of simple incision were better in gonorrhœal cases than in any other class. This apparent showing I believe to be fallacious. It has been, and is my belief, that recent gonorrhœal pus tubes should not be operated upon by incision and drainage, for two reasons: First, that if operated upon the good results would only be temporary in character; and second, that radical operation gives excellent results in these cases, as it is well recognized that gonorrhœal pus seldom gives rise to postoperative peritonitis. Therefore, of the nine cases of gonorrhœal pelvic abscess, eight were cases of long standing; and so far as a limited number can, these cases show that good results can be obtained by incision and drainage in long-standing cases of gonorrhœal pyosalpinx and intraperitoneal abscess, but they have no bearing upon the question of incision and drainage in recent gonorrhœal cases.

The following are the conclusions which I have drawn from the experience of operations in 200 cases of pelvic suppuration in women, and from a study of the results obtained. These are presented for your discussion:

The methods of dealing with suppuration of the uterine appendages have been greatly improved within the past fourteen years. The mortality has been reduced from more than sixteen per cent. in the first half of this period to less than five per cent. in the second half.

This reduction in the mortality has been obtained by: 1. Abandoning abdominal section in the treatment of pyosalpinx and abscess of the ovary when complicated by intraperitoneal abscess, and by substituting direct incision and drainage in this group of cases, and also for recent cases of pelvic suppuration of puerperal origin. 2. By substituting hysterectomy for oöphorosalpingectomy for the removal of bilateral suppuration in the uterine appendages. These changes in methods of operation have permitted the development of a much more perfect technic, which yields greatly improved results, remote as well as immediate. Ventral hernias, pedicle abscesses and troublesome intraperitoneal adhesions have become very rare instead of very frequent sequels of abdominal operations.

Free incision and drainage in cases of suppuration of the uterine appendages complicated by intraperitoneal abscess has proven to be a most valuable life-saving measure, yielding a mortality of less than two per cent., as contrasted with twenty-seven per cent., from abdominal section. The remote results

have been scarcely less gratifying, thirty-two of the fifty-four having been permanently cured.

Incision and drainage has proved to be a most conservative operation, not only in the saving of life, but in the conservation of the sexual organs. Of the fourteen patients in whom subsequently a radical abdominal operation was performed, in only three was it necessary to remove more than one uterine appendage. The substitution of incision for the radical operation has saved many young women from the annoyance of a premature menopause, and has enabled a number of them to bear children. Six pregnancies are known to have occurred, resulting in five children—one pair of twins—one miscarriage, and one pregnancy now developing.

Direct incision and drainage finds its best indication in: (1) puerperal phlegmon; (2) puerperal ovarian abscess, intraperitoneal abscess and pyosalpinx; (3) in complicated cases of pelvic suppuration of whatever origin, in which the pus is not contained within the ovary and tube. The value of direct incision is most manifest in the worst class of cases, in which the patient is acutely ill from suppuration and peritonitis, and in which abdominal section gives its worst results.

Finally, I wish to acknowledge my indebtedness to Dr. W. S. Crosby, Ellice McDonald and Stephen E. Tracy, who have compiled the elaborate tables necessary for the preparation of this paper; and also to the family physicians who have kindly answered inquiries as to the present status of many of the patients.

Appended is a table of the cases of incision and drainage.

SUMMARY OF TABLE OF ABDOMINAL SECTIONS FOR SUPPURATION IN UTERINE APPENDAGES TO MAY 18, 1901

A. DIVISION I.

Hysterectomy for circumscribed pus limited to uterine appendages:

| | |
|---|---|
| Cases | 46 |
| Deaths | 1 |
| Mortality | 2.1% |

DIVISION II.

Hysterectomy for intraperitoneal pus in addition to pus in uterine appendages:

| | |
|---|---|
| Cases | 4 |
| Deaths | 2 |
| Mortality | 50% |

B. DIVISION I.

Appendages removed for circumscribed pus contained in a tube or ovary:

| | |
|---|---|
| Cases | 74 |
| Deaths | 7 |
| Mortality | 9.4% |

Appendages removed for circumscribed pus contained in a tube or ovary since January 1, 1895:

| | |
|---|---|
| Cases | 17 unilateral; 17 bilateral |
| Deaths | 2 |
| Mortality | 5.8% |

DIVISION II.

Appendages removed for intraperitoneal abscess in addition to pus in ovary and tube:

| | |
|---|---|
| Cases | 22 |
| Deaths | 5 |
| Mortality | 22.7% |
| Total cases of abdominal section | 146 |
| Total deaths | 15 |
| Total mortality | 10.2% |

Mortality from abdominal section for pus cases previous to 1895: Cases 55, 9 deaths, 16.3% mortality.

Mortality from abdominal section in pus cases subsequent to 1895: Cases 91, 6 deaths, 6.5% mortality.

| | |
|---|---|
| Cases of incision and drainage for pelvic suppuration | 54 |
| Deaths | 1 |
| Mortality | 1.8% |
| Grand total of cases since January 1, 1895 | 145 |
| Deaths | 7 |
| Mortality | 4.8% |

## Vaginal Incision and Drainage for Pelvic Suppuration—Hospital Cases.

| Name and Date of Operation. | Family Physician. | Diagnosis. | Operation. | Result. | Subsequent History. |
|---|---|---|---|---|---|
| Mrs. S., January 11, 1896. | C. R. Marshall. | Suppurating ectopic pregnancy; sinus into vagina, through which femur of fetus protruded. | Vaginal incision and drainage. | Recovered. | Has remained well. December 15, 1901. |
| Mrs. M. H., May 9, 1896. | | Double pyosalpinx, acute nephritis. | Vaginal incision and drainage. | " | |
| Mrs. I. S., December 7, 1896. | D. F. Greenewald. | Suppurating ectopic pregnancy. | Vaginal incision and drainage. | " | Permanent recovery. December 15, 1901. |
| Mrs. B. R., March 11, 1897. | David Riesman. | Puerperal cellulitis. | Vaginal incision into exudate; no pus. | " | Was well when last heard from. December 10, 1901. |
| Mrs. F. D., March 24, 1897. | Wm. E. Parke. | Pelvic exudate following salpingooöphorectomy. | Vaginal incision and drainage. | " | |
| Mrs. F. L., April 3, 1897. | Wm. E. Parke. | Mass in right broad ligament, from old pedicle abscess. | Vaginal incision and drainage. | " | |
| Mrs. B., May 8, 1897. | Wm. N. Ferguson and Thos. E. Jones. | Pelvic abscess behind left broad ligament; puerperal | Vaginal incision and drainage. | " | Hysterorrhaphy a year later; Ut. appendages normal. Well, June 1901. |
| Mrs. F. J., October 27, 1897. | J. C. Brobst. | Suppurating ovarian cyst. | Ischiorectal sinus incised and packed; vaginal incision and drainage. | " | Failure—sinus persisted. Secondary abdominal hysterectomy. Recovered. |
| Mrs. M. K., November 22, 1899. | C. R. Marshall. | Suppurating ovarian cyst. | Vaginal incision; no pus reached. | " | Secondary abdominal section; hysterectomy; recovered. |
| Miss S. D., February 24, 1898. | Wm. N. Ferguson. | Pelvic abscess (abortion) pint of pus. | Vaginal incision and drainage. | " | Made good recovery. January 6, 1902. |
| Mrs. J. G. P., March 23, 1898. | J. H. Ruhl. | Postoperative inflammatory cyst. | Vaginal incision and drainage. | " | Good recovery. |
| Mrs. A. N., May 14, 1898. | Hannah M. Thompson. | Pelvic abscess (abortion). | Vaginal incision and drainage. | " | Has remained well. January 15, 1902. |
| Mrs. U. P., December 17, 1898. | | Pelvic abscess, acute peritonitis. | Vaginal incision and drainage. | " | |
| Mrs. S., January 25, 1899. | Helen Kirshbaum. | Pelvic abscess, extensive peritonitis; dermoid cyst. | Vaginal incision and drainage. | " | Subsequent celiotomy; oöphorosalpingohysterectomy. Recovered. |
| Miss F. B., September 4, 1899. | | Pelvic abscess; post abortum. | Vaginal incision and drainage. | " | Good recovery. Well 1 year later. |

VAGINAL INCISION AND DRAINAGE FOR PELVIC SUPPURATION—HOSPITAL CASES. *Continued.*

| Name and Date of Operation. | Family Physician. | Diagnosis. | Operation. | Result. | Subsequent History. |
|---|---|---|---|---|---|
| Mrs. S. H., September 28, 1899. | | Pelvic abscess. | Vaginal incision and drainage. | Recovered. | |
| Mrs. E. L., January 18, 1900. | W. E. Hall and J. H. Pugh. | Pelvic abscess; post abortum. | Vaginal incision enlarged and drainage. | " | Failure—secondary unilateral salpingooöphorectomy. Well June, 1901. |
| Miss C. H., March 3, 1900. | Isaac Leopold. | Pelvic abscess; post abortum. | Vaginal incision and drainage. | " | Sinus persists. |
| Miss A., March 21, 1900. March 26, 1900. | | Pus tubes; gonorrheal Pelvic abscess; acute peritonitis. | Vaginal incision and drainage. | " | Made good recovery after second incision. |
| Mrs. I. B., April 7, 1900. | L. Boyer. | Postoperative exudate. | Vaginal incision and drainage. | " | Good recovery. December 15, 1901. |
| Mrs. M. G., October 6, 1900. | | Pelvic abscess. | Vaginal incision and drainage. | " | |
| Mrs. M. M., December 15, 1900. | T. E. Jones. | Pelvic abscess (puerperal) acute peritonitis—sepsis large amount of pus. | Vaginal incision and drainage; second incision opposite side. | " | Health good. Increased weight. January 15, 1902. |
| Mrs. N., December 17, 1900. | J. J. Moylan. | Right ectopic pregnancy nephritis. | Vaginal incision and drainage; pack. | " | Abdominal section to remove tubal mole. June 8, 1901; salpingooöphorectomy. Made good recovery. |
| Mrs. I. H., December 20, 1900. | Isaac Leopold. | Pelvic abscess. | Vagiral incision and drainage. | " | Reopened abscess. Good recovery. |
| Mrs. D., January 9, 1901. | G. Y. MacCracken. | Pelvic hematocele associated with cancer and phlebitis. | Vaginal incision and drainage (gauze). | " | Good recovery. |
| Mrs. M. W., January 30, 1901. | J. A. Krug. | Large pelvic abscess; septicemia. | Vaginal incision and drainage. | " | August 15, needs radical operation. |
| Miss P. K., January 31, 1901. | | Tubo-ovarian abscess; acute peritonitis. | Vaginal incision and drainage. | " | Left salpingooöphorectomy and hysterorrhaphy, February 27, 1901. |
| Mrs. E. C., September 27, 1901. | J. H. Lowright. | Large pelvic abscess; gonorrheal. | Vaginal incision and drainage (gauze). | " | Good recovery, February 15, 1902. |

## Vaginal Incision and Drainage for Pelvic Suppuration—Outside Cases.

| Name and Date of Operation. | Family Physician. | Diagnosis. | Operation. | Result. | Subsequent History. |
|---|---|---|---|---|---|
| Mrs. McN., January 28, 1895. | W. D. Robinson. | Pelvic abscess following dilation and injection of hydrogen peroxid. | Vaginal incision and drainage. | Recovered. | Is entirely well. December 6, 1901. |
| Miss K., January 28, 1896. | Franklin Brady. | Gonorrheal pelvic abscess from long-standing pus tubes; peritonitis; acute sepsis. | Vaginal incision and drainage. | Recovered. | Has continued well and has been able to do hard work. December 1, 1901. |
| Mrs. R., February 23, 1896. | J. T. Walker. | Puerperal abscess. | Incision left groin and vaginal incision. | Recovered. | Has remained well. December 10, 1901. |
| Mrs. B., February 26, 1896. | W. D. Robinson. | Puerperal pelvic abscess, intraperitoneal, about brim of pelvis. | Vaginal incision and drainage. | Recovered. | Pelvic organs normal, has had one child since. December 6, 1901. |
| Miss H., December 31, 1896. | B. F. Hawley. | Gonorrheal pelvic abscess, almost moribund from peritonitis and sepsis. | Vaginal incision and drainage. | Recovered. | Felt well, but had adherent appendages when last seen; is married; sterile. |
| Miss F., October 5, 1898. | J. C. Cooper. | Gonorrheal pelvic abscess. | Vaginal incision and drainage. | Recovered | Has continued well; is married; no children. December 5, 1901. |
| Mrs. S., February 6, 1899. | Mary H. Cheney. | Suppurating hematocele; ectopic pregnancy. | Vaginal incision and drainage. | Recovered | Right hydrosalpinx developed; abdominal section, unilateral salpingoöphorectomy May 3, 1899. Is well. |
| Mrs. R., March 5, 1899. | W. E. Hall and J. H. Pugh. | Puerperal pelvic abscess. | Vaginal incision and drainage. | Died of heart clot shortly after operation. | |
| Miss H., October 27, 1899. | I. Leopold. | Puerperal pelvic abscess opening into rectum. | Vaginal incision and drainage. | Recovered; secondary hemorrhage. | Sinus; second operation in hospital, March 3, 1900. Sinus remains. |
| Mrs. L., November 25, 1899. | J. H. Pugh. | Recent puerperal pyosalpinx, pelvic abscess and fibroids. | Vaginal incision and drainage. | Recovered, but not cured. | Sinus persisted; second incision January 18, 1900, and later abdominal section to remove right appendage. |
| Mrs. A., December 14, 1899. | G. H. West. | Pelvic gonorrheal abscess; sick for 20 years. | Vaginal incision and drainage. | Recovered. | Has continued to do well except painful menstruation. December 15, 1901. |
| Mrs. S., December 15, 1899. | J. C. Cooper. | Pelvic abscess. | Vaginal incision and drainage. | Recovered. | Involved right appendage removed by celiotomy, February 5, 1900. Left appendage for ectopic pregnancy. May 17, 1901. |
| Mrs. S., January 21, 1900. | Helen Kirshbaum. | Puerperal pelvic abscess. | Vaginal incision and drainage. | Recovered. | Made good recovery; since delivered of a child. |

VAGINAL INCISION AND DRAINAGE FOR PELVIC SUPPURATION—OUTSIDE CASES. *Continued.*

| Name and Date of Operation. | Family Physician | Diagnosis. | Operation. | Result. | Subsequent History |
|---|---|---|---|---|---|
| Miss S., January 24, 1900. | I. Leopold. | Recent gonorrheal pyosalpinx and abscess. | Vaginal incision and drainage. | Recovered. | Is married and well; has not been pregnant. December 4, 1901. |
| Mrs. P., May 19, 1900. | Ellwood Patrick. | Puerperal pyosalpinx and abscess, post-abortum. | Vaginal incision and drainage. | Recovered. | Second abscess pocket opened June 14; has improved until now has entirely recovered her strength. Has had one attack of peritonitis; requires a radical operation. December 13, 1901. |
| Mrs. M., June 15, 1900. | Ellwood Patrick. | Puerperal pyosalpinx and abscess, post-abortum. | Vaginal incision and drainage. | Recovered. | Has since enjoyed good health. December 13, 1901. |
| Mrs. H., October 4, 1900. | H. Jarrett. | Gonorrheal pelvic abscess. | Vaginal incision and drainage. | Recovered. | Made very good recovery and is entirely comfortable. December 10, 1901. |
| Mrs R., January 31, 1901. | Joseph Bringhurst. | Large pelvic abscess, gonorrheal; acute sepsis, patient very ill. | Vaginal incision and drainage. | Recovered. | Second pocket opened by vaginal incision four weeks later, fecal fistula developed; December 5, 1901, is quite well and strong, without pelvic discomfort; tiny fistula, through which gas but no fecal matter escapes, is still present. |
| Mrs. A., May 1, 1901. | Edward Kerr. | Puerperal phlebitis and cellulitis of right broad ligament; operation 34 days after labor. | Vaginal incision; perforation of the exudate, no pus found. | Recovered. | Has since remained well. December 10, 1901. |
| Mrs. G., May 19, 1901. | Helen Kirshbaum and W. Wayne Babcock. | Puerperal ovarian abscess. | Vaginal incision and drainage. Mass consisting of suppurating ovary was freely movable, broad ligament but little infiltrated. | Recovered. | Made good recovery; appendage involved is normal on examination; patient pregnant. |
| Mrs. J., June 3, 1901. | W. T. Sharpless. | Pelvic abscess secondary to appendicitis. | Vaginal incision and drainage. | Recovered. | Made good recovery; pelvic organs normal in position and free from tenderness. November 2, 1901. |

## Incision and Drainage Through the Abdominal Walls for Pelvic Suppuration.

| Name and Date of Operation. | Family Physician. | Diagnosis. | Operation. | Result. | Subsequent History. |
|---|---|---|---|---|---|
| Mrs. H., April 21, 1891. | I. Leopold. | Puerperal phlegmon right broad ligament; extensive peritonitis. | Incision through right groin; drainage. | Recovered. | October 27, 1892, was operated on for ventral hernia; abdominal and pelvic contents normal except slight adhesions; right ovary and tube normal. Delivered at term 18 months later. |
| Mrs. X., May 1, 1894. | Thos. D. Dunn. | Puerperal phlegmon left broad ligament pointing through inguinal canal. | Incision through left groin. | Recovered. | Four years later she was well and had given birth to twins. |
| Mrs. B., November 11, 1895. | Wm. A. Cross. | Puerperal pyosalpinx and intraperitoneal abscess, seen 18 days after labor; patient very ill and septic. | Direct incision and drainage. | Recovered with sinus. | Abdominal section and removal of right pyosalpinx March 2, 1896; patient miscarried June 5, 1897; has been well since. |
| Mrs. L., December 12, 1895. | R. R. Stoner. | Puerperal pyosalpinx 21 days after labor; edema of lungs; acute nephritis | Direct incision and drainage; general peritoneal cavity opened and packed with gauze. | Recovered. | March 1, 1897, abdominal section; small right ovarian tumor and occluded right Fallopian tube, and an adherent vermiform appendix removed; good permanent recovery. |
| Miss R., March 4, 1895. | W. E. Hall. | Tuberculous pelvic abscess opening into rectum. | Incision through left groin for drainage. | Recovered with fistula. | Subsequent abdominal section; left salpingooöphorectomy October 30, 1897, and closure of fistula. |

# XXVIII. A CASE OF STRANGULATED HERNIA OF THE OVARY AND FALLOPIAN TUBE

By A. T. BRISTOW, M. D.

BROOKLYN

M. E. W., a cook, aged forty-four years, was admitted to St. John's Hospital in October with a painful tumor of the left inguinal region. Her history was as follows: At the age of eight years she had been kicked by a horse, after which a tumor appeared in the left inguinal region, evidently a hernia. No treatment was given and after an interval, the length of which the patient does not recollect, the hernia disappeared. At the age of forty (that is, four years ago) the hernia reappeared, but was easily reduced and gave no further trouble until two years ago, when it again reappeared and was again reduced as before, no tumor being present after reduction. Patient has borne six children. Ten days before admission into hospital, while lifting a heavy weight she felt a sudden pain in the left inguinal region and a small tumor, which she could not reduce as usual, appeared in that situation. The following day it had increased in size and was very painful. This condition continued, the pain, however, becoming more severe; at no time were there any symptoms pointing to a strangulated hernia of the bowel, although slight nausea had been complained of. On admission to the hospital her temperature was but 99.5° F.; although there was a hernial tumor in the groin that was strangulated it was evident that it could not be the bowel. It was hard to the touch, dull on percussion, and had a distinct impulse on coughing. The skin was slightly reddened over the tumor. It was thought that a portion of the omentum had become caught in the grip of the inguinal opening and immediate operation was decided upon.

The usual incision for hernia was made and a much thickened sac exposed. On opening this it became at once evident that we had to deal with a hernia of the left Fallopian tube and ovary, together with an abscess in the tube. The ovary, much changed in appearance, lay in its usual position behind the tube and was cystic. The fimbriated extremity of the tube seemed almost normal, but about an inch and a half from the extremity there was a dilatation of its caliber, which proved to be an abscess cavity containing about half an ounce of thin purulent fluid. This was ruptured in process of separating the adhesions which had formed between the much-thickened tube and the hernial sac. The round ligament was also a part of the hernial contents and was greatly enlarged, being at least the size of the middle finger. Microscopical examination showed this thickening to be inflammatory solely, nothing but the characteristic small round-cell infiltration being present. The removal of the sac and its contents was accomplished without opening the abdominal cavity, and it was therefore deemed inadvisable in view of the suppurative process to subject the patient to the risk of separating the adhesions from the sac; so the

stump of the broad ligament was sutured in the inguinal canal, much after Kocher's fashion of securing the sac in his operation for the radical cure of hernia, the external oblique being sutured in the usual manner; after a thorough cleansing with salt solution the external wound was closed without drainage. The patient made a good recovery. Subsequent examination showed that the uterus was well over to the left side. In this case it seems as if it were impossible for the woman's account of herself to have been correct. The peritoneum of the broad ligament was firmly adherent to the parietal peritoneum and the adhesions there and in the sac were of ancient date, so that the abdominal cavity was entirely shut off from the inguinal canal. Reduction could never have been complete, but must have been partial or "en masse," and even this was not possible after inflammatory process took place in the tube with abscess-formation and inflammatory changes in the round ligament and other structures. No twist had taken place in that part of the broad ligament which had been dragged through the hernial opening, for the vessels lay on the pelvic side of the tumor in their usual situation. It is not impossible that this was not properly a strangulated hernia, but simply a hernia of the ovary and tube with an inflammatory process starting in the tube and extending subsequently to the adjacent structures.

Cases of hernia of the ovary are not so rare as may be supposed. I have been able to collect about one hundred. The first case on record is that of Gouey, of Rouen, in 1716, and is referred to by Barnes in his work on the diseases of women. Here gestation occurred in a hernial sac and the reporter operated and removed a three-months' embryo. However, while the pregnancy is cited as conclusive proof of the existence of an ovary in the sac, in which opinion Cruveilhier, who also refers to this case, concurs, it does not seem to me as proven, and I should be inclined to place this case as the first recorded successful operation for extra-uterine gestation rather than as an ovarian hernia. Pott's case, however, in 1756 is authentic. Here the ovaries were removed from a hernial tumor in each groin, the patient being a woman of twenty-six. No further menstruation occurred. In 1779, Desault reported a case of inguinal hernia containing the left ovary, tube and an elongated cornu of the uterus. In the last century the cases which have been reported have been relatively quite numerous so that now they number over one hundred.

A careful survey of the literature brings out the following facts which are of interest: (1) Congenital hernia of the ovary are always accompanied by a hernia of the tube as well; (2) in very many of these cases other congenital defects, notably of the genital tract, exist. In six of the early cases reported there was an absence of the uterus, and a number of other cases have been reported in which there was a shallow or absent vagina.

and in one case the woman had a spina bifida. A closer examination of many of the cases reported in literature with reference to the presence of similar defects would, perhaps, have shown them. Another peculiarity of these herniæ is that a large number of them have occurred in very young children, as young as three months, and most of them in young girls. So frequently has this been the case that one French observer has written a monograph on "Hernie de l'ovaire, particulierement chez la petite fille." These two facts, namely, the occurrence of other defects of development and the frequent occurrence of the hernia in very young infants, gives us the clue to the pathology. In the male in fetal life the testicles lie in the lumbar region of the abdomen. From this point they are gradually shifted, until about the seventh month they are opposite the inguinal canal, which they enter at the eighth month. The descent of the testis into the scrotum is intimately connected with the gubernaculum. This is a bundle of muscular fibers which become developed from the mesorchium while the testis is still an abdominal organ. As this fold shortens it draws the testis into the inguinal canal and finally into the scrotum. In the female the gubernaculum is represented by the round ligament. Now it is well known to all teratologists that sexual confusions take place during the development of the fetus which result in the various phenomena of so-called hermaphroditism; these may vary from a simple hypospadias in the male to the more serious defects which make the distinction of sex often difficult. I believe that the cases of congenital hernia of the ovary of the inguinal variety may be attributed to the same condition of perverted development, so that the ovary takes the course of a testicle. Be it remembered that the ovaries also undergo a considerable change of position in the course of development which is accompanied by a shortening of the band which corresponds to the gubernaculum testis. This band, as it passes by the united part of the Müllerian ducts which are forming the body of the uterus becomes laterally attached to that organ, and the descent of the ovary is normally arrested at the side of the uterus. When this does not happen, the ovary follows the course of the testis and may be found as low as the labium majus. Exactly the reverse happens in the male, in which case, as a result of a faulty development of the gubernaculum, the testis does not descend and the individual becomes a cryptorchid. Much the same results follow in both sexes from the presence of the distinctive sexual glands in the inguinal canal. The tumors are always painful on pressure, and in the female become enlarged during menstruation and also, according to some observers, dur-

ing sexual excitement. In one reported case the painful crises resulting from a double inguinal hernia of the ovaries had driven the woman to several attempts at suicide; the removal of the offending glands resulted in cure. Extra-uterine pregnancy is said to be quite common in cases of hernia of the ovary. It is likely that such cases would occur when there is a hernia of both ovary and tube. Here, as a result of the constriction of the tube, there is likely to be at least a catarrhal salpingitis, and as the tube and ovary are shut off from the abdomen by the neck of the sac it is possible for a discharged ovary to reach the diseased or obstructed tube alone, and as a natural result we should expect an extra-uterine pregnancy.

Of all the varieties of ovarian hernia, inguinal is the most common. In three cases reported by English, twenty-seven were inguinal, nine crural, one into the obturator foramen, and one into the sciatic notch. The inguinal is apparently the only class that deserves the name of congenital, the other varieties being all acquired. As a notable instance of what can occur, one case is reported in which the uterus with both ovaries and tubes was found in the sac of a femoral hernia. In many cases of inguinal hernia one cornu of the uterus has been found in the sac; when a sound has been passed into the tube, it has always passed an abnormal distance before meeting the uterine cavity, in one instance nineteen inches. The hernia of the uterine cornu is always secondary to the ovarian and tubal hernia and is the result of traction, the uterine tissue being drawn out.

It seems not impossible that the cases of uterus bicornua reported in connection with this defect may not have been, indeed probably were not, congenital but rather resulted from the constant traction on the uterine tissue caused by the hernia. In a number of these cases the round ligament was found much hypertrophied. One writer uses the exact expression that I have in describing the size of the ligament, "as large as the finger." So, too, the statement has been made as the result of observation that during menstruation the size of the round ligament becomes increased. A permanent increase in size would be the result of frequent congestion which, owing to the constriction of the sac, would most certainly become chronic. It is not unlikely that strangulation of these herniæ may be due to this slow increase in size and to an incident inflammatory process. From the history of the other strangulated cases, as well as that of my own, the process does not seem to have been very acute.

When an inflammatory process has taken place and the hernial sac contains no intestine, the method I followed seems to possess

some advantages, inasmuch as it firmly closes the ring with tissues already organized and does not subject the patient to the risk of opening the abdomen, which latter is quite unnecessary. In those cases in which the herniated ovary and tube can be returned to the abdomen, the condition of these structures will decide the advisability of their removal. If reasonably healthy they may be returned and the Bassini operation for the cure of the hernia will usually prevent its recurrence. In all cases of hernia of the ovary, operation is required, so general and complete is the disability consequent on this condition. Many of these ovaries, particularly when the hernia is of long standing, become cystic. Indeed, it may be difficult to find any trace of ovarian tissue left, so altered may the structure become through changes in its nutrition. The mortality of the operation is very low; I have been able to find a record of but one death. One reason for this low mortality even in preantiseptic times is the fact that all the operations have been extraperitoneal.

With reference to the acquired hernia, it may be observed that they nearly all occur on the right side. This is due probably to the fact that the right ovary is more nearly in the iliac fossa than is the left, which usually lies deeper in the cul-de-sac. Acquired herniæ are also usually single. A number of cases of hernia of the ovary have been reported in very young children, the youngest being but three months old. Barnes explains these cases by the fact that the uterus and tubes and ovaries lie much higher in the infant than in the adolescent, but this does not seem to the writer an adequate explanation. As before stated, the very fact that these herniæ occur in very young infants, together with the fact that in many cases other defects were reported, seems to give color to the belief expressed that these herniæ are due to defective development.

The diagnosis of ovarian hernia before inflammatory changes have taken place ought to offer no special difficulties. The presence of a small tumor in the inguinal, or more rarely the femoral regions, enlarging during menstruation, always tender to the touch even though no trace of inflammation be present, should warn us that we have an ovary to deal with rather than an epiplocele. Indeed, if we except the added tension and size of the tumor during menstruation, these cases resemble their counterparts in the male of undescended testis. The influence of the menstrual epoch on such an inguinal or femoral tumor will, of course, be the strongest corroboration. In my own case, as I did not see the patient until after the advent of a more or less acute process, when the tenderness was general and evidently due to the inflammation, the error in diagnosis was, perhaps,

pardonable. At all events the treatment of this condition is by operation and must consist either in the return of the herniated ovary to the abdomen or its removal.

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# XXIX. A NEW METHOD OF BISECTING THE UTERUS IN ABDOMINAL HYSTERECTOMY

By C. H. RICHARDSON, M. D.
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Abdominal hysterectomy, through more recent solution of its technical difficulties, and a little better understanding of the advantages afforded by it, has found progressively a wider field of application. The facility with which abdominal hysterectomy is performed, especially in chronic inflammatory pelvic disease, is now more readily appreciated than a few years since, when surgery was largely influenced by the so-called vaginal route of the French school of gynecologists. Of the many technical modifications which have been recently presented there is, perhaps, none which affords greater facility in the operation than that which involves a median or partially median section of the uterus, as a preliminary to the enucleation of bilateral pus sacs or densely adherent uterine appendages associated with fistulæ. The distinct advantages it presents, require no argument to compel its use with those familiar with its minute technique.

Concerning the propriety of removing the uterus in cases of extensive inflammatory disease, although not strictly relative to the subject of this paper, I cannot refrain from saying that I believe nothing is gained by leaving a uterus that necessarily has become hypertrophied, soft and flabby from chronic passive congestion, and usually associated with chronic endometritis, especially in cases of gonorrhœal origin. The number of patients requiring a secondary operation for its removal before complete cure is effected testifies to this fact.

The operation as ordinarily performed is as follows: The patient is placed in the Trendelenberg position and the abdomen opened. If adhesions to the omentum and intestine exist, they should be carefully dissected with the knife from their adhesions rather than torn, as minute tears of the intestines are apt to occur from this procedure which are overlooked at the time of the operation. The abdominal cavity is thoroughly packed off with gauze tampons. The uterus with its adhesions can now be seen and it is separated from the rectum without much danger of laceration. The uterus is brought well up, and either corner seized with strong forceps and firm traction exerted by assistants. An incision is made in the median line of the uterus, carried through the body and necessarily through the uterine cavity as well. The tension on either half prevents any con-

siderable hæmorrhage. If removal of the enteric cervix is contemplated, the median incision is carried down to the attachments of the bladder and rectum and these organs freed from their attachment in the usual manner and the incision carried clear through the median line of the cervix. Some prefer to leave a short stump of the cervix, as this saves opening the vaginal vault, thereby eliminating the chances of infection from the vagina. This I think the much safer procedure. If a stump is to be left, when the point is reached where it is desirable to amputate the cervix, a second pair of forceps siezes either half of the cervix and lateral incisions complete the amputation.

Dr. W. G. Macdonald called attention, in a paper read before this society in October last, to the supreme importance of dividing the tissues of the lateral wall of the cervix, fibre by fibre, to prevent wounding the uterine artery. When it presents it can be grasped with an artery clamp and ligated separately. The tissues to be removed are now practically divided in halves. The fingers are used to separate the adhesions of the tubes and ovaries from *below*, and the ease with which they will "lift up" with the line of cleavage started from underneath, so to speak, is appreciated by those who have tried it. It is quite easy to remove a large adherent pus tube or a thin walled cyst without rupture, when, if attempted from above, it would be well nigh impossible.

The operation is completed by continuing the incision along the base of the broad ligament, the bleeding points clamped as they present, and a side to side, overlying continuous suture to control all capillary hæmorrhage.

While it is true that infection does not often take place when the uterus is bisected in the median line, yet exposing the pelvic cavity to the chances of infection from the endometrium of the uterine cavity, has been the principal objection so far to this most valuable procedure. With my method of bisection the objection is obviated, as the uterine cavity is not opened at all. Instead of making the incision in the median line, it is made on either side, beginning near the horn of the uterus, and carried down through the tissues of the walls of the uterus and cervix; so when completed one section contains practically the whole body of the uterus with its cavity, and the other only a narrow strip of the wall. A little practice will teach one to keep within the wall of the uterus. The hæmorrhage is a trifle more profuse from the "narrow strip" than when divided in equal parts, but this is of minor importance.

It will be seen at once that this method of bisection allows all the advantages of median bisection, but admits of no danger of infection from the uterine cavity, the heretofore principal objection of its opponents.

# XXX. PNEUMOGALACTOCELE OF THE BREAST, WITH AN UNIDENTIFIED ORGANISM

By J. MILTON MABBOTT, M. D.
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Pneumogalactocele, a term the Greek derivation of which is sufficiently simple, is a tumor containing gas and milk. It might seem superfluous to add the qualifying phrase "of the breast," but I find that the term *galatocele** was also applied by Vidal de Cassis to a tumor produced by effusion of a white fluid into the *tunica vaginalis* which he considered to be true milk. The qualifying phrase will also secure more definite indexing. The allied term *pneumohydrometra* is defined by Dunglison as "a condition in which gas is generated in the uterus by the decomposition of fluid." With this as a precedent, though not literally indicating the *generation* of gas, the term *pneumogalactocele* is chosen in preference to *mastitis aerogenes* as being sufficiently definite, whereas the latter term would unduly convey the idea of inflammation, at the same time failing to indicate that the accompanying fluid is of a *lacteous* rather than of a purulent character.

The term *galactocele* is preferable to mastitis for the reason also that it has been generally adopted in references to a condition of the breast similar in every respect to that now under consideration,† with the exception that the presence of *gas* in such a tumor, so far as I have been able to ascertain, has never before been recorded. The case which I desire to report is probably unique in this respect, and the fluid contained an apparently hitherto unrecognized organism. Dr. Harlow Brooks, corroborating Dr. Berry, has been entirely unable to identify it from the bacteriological report.

The patient, K. L., primipara, aet. twenty years, was delivered at the New York Infant Asylum, February 7, 1899. It was recorded on that date that her breasts were normal both as to glandular structure and nipples. Labor had been tedious, ending with laceration of the perineum and retained secundines, delivered artificially. There was no excessive hæmorrhage and no special evidence of exhaustion other than a rapid pulse (120), which had been of the same frequency early in the first stage. The house physician, Dr. Lawrence T. Royster, decided to do immediate perineorrhaphy under chloroform. The woman sank into a state of syncope, requiring

* Dunglison's Medical Dictionary.

† Breast, Cystic Tumors of, Index Catalogue of Library, Surgeon General's Office, U. S. Army, 2nd Series, Vol. II.

abandonment of the operation and resort to active measures for resuscitation, including free administration of stimulants hypodermatically and saline infusion under both breasts and into the right median cephalic vein. The location of the mammary punctures afterwards seemed to indicate that the injection-needle had passed *through* the outer margins of the mammary glands instead of *beyond* them as had been intended.

The patient developed febrile symptoms, commencing almost immediately after delivery, and the treatment included two vaginal douches daily, one of sterile water and the other a bichloride solution (1-5000). From the subsequent history, however, the inference seems justifiable that the fever may have been related chiefly or entirely to the mammary complications which supervened. Of these the first was an ordinary suppurative mastitis of the left breast, which required incision on the eighth day and progressed favorably thereafter. The temperature came down to normal on the same day and remained so.

In the meantime the right breast had been constantly distended from the third day after delivery and had been subjected to considerable massage and expression. The infant had never nursed. The general distention gradually subsided, and at the end of the third week the tumor which is the subject of this paper had become distinctly localized in the upper and outer quadrant. The tumor was larger than a flattened goose-egg, measuring 4x2½ inches, the long diameter corresponding more or less closely with the radius of the breast. The skin over it was cool and natural, and the feeling was that of a rather thin-walled cyst. As the patient had been free from fever for nearly two weeks, it was natural to assume that the contained fluid should be a milky secretion and the tumor therefore an ordinary galactocele.* But, to our great surprise, percussion elicited tympanitic resonance over an area measuring about 2x2½ inches. This tympanitic percussion note was always obtainable over the uppermost accessible portion of the tumor, changing its location according to the position of the patient. We were evidently dealing with a sac containing gas as well as a liquid. And lastly among the physical signs, active shaking of the breast produced perfectly typical succussion sounds which could be heard at a distance of several feet. Among those who saw the case at this stage were Dr. E. B. Cragin and Dr. E. A. Tucker, as well as several of my colleagues on the staff of the Infant Asylum, including Dr. E. E. Tull and Dr. G. T. Harrison.

The treatment of the case is of little interest. On March 1st, aspiration drew off about six drachms of clear, colorless gas, which was collected in an inverted tube under water and sent to a laboratory. But we were informed that the quantity was insufficient for identification as to its composition. A coarse aspirating needle became repeatedly clogged by the coagula contained in the fluid, and after securing a specimen for examination the patient was simply kept under observation for another month. The tumor remained *in statu quo* and there was no re-accumulation of gas after the aspiration. All who saw the case, however, were of the opinion that the

* Beamish, R. T. *Brit. Med. Jour*, 1884, II, 712.
Clutton, H. H. *St. Thomas's Hosp. Reports*, 1879, N. I. X., 65.
Jewett, C. *Proc. Med. Soc. Co. Kings*, 1883-4, VIII, 151—3.
Parker. *Med. Times and Gazette*, London, 1882, II. 211.

gas had been generated in the sac and *not* injected during the hypodermoclysis.

Concerning the fluid, a detailed bacteriological report from *Pædiatrics* Laboratory under date of May 27, 1899, is subjoined. To Dr. Dillion Brown, director of the laboratory, and Dr. J. L. Berry, bacteriologist, I desire to acknowledge myself deeply indebted.

*Bacteriological Report. Character of Specimen:* Fluid from Breast. Specimen consisted of about two drachms of smooth creamy fluid of alkaline reaction and showing under microscope partly degenerated cells resembling colostrum corpuscles and milk globules, fat drops, motile bacteria and a mass of granular debris.

*Cultures:* Broth culture of twenty-four hours showed very active growth with diffuse cloudiness of medium, no pellicle formation. Examination of hanging drop showed a medium-sized exceedingly active bacillus.* Smears stained with methylene blue showed a pure culture of the same organism. In forty-eight hour culture there was a very active spore formation, about three-fourths (¾) of the bacilli showing large central spores, while the remainder had developed into remarkably long, slender threads, with very pointed extremities and still actively motile. Glucose Broth: Same results as in plain broth, with rather larger proportion of long threads.

*Agar:* Rapid development, surface of slant covered in twenty-four hours with thick, moist, yellowish white growth showing under microscope the same characteristics as in twenty-four hour broth culture, except that bacilli were smaller, and in cultures of longer growth spore formation was somewhat less active and the development of long forms much less noticeable than in corresponding broth cultures.

*Serum Tubes:* Growth less abundant than on agar, and bacilli very much smaller. Agar plates: Pure culture of bacillus, colonies tending to coalesce and cover surface of plate. Stick culture in glucose agar: Active growth both on surface and along line of puncture, but no evidence of gas formation. Gelatine: Growth slower than on agar, with slight liquefaction in old cultures. Fermentation-tubes of glucose broth: Growth produces no gas after long inoculation. Flasks of Dunham's solution with strips of lead paper suspended above fluid: No blackening of lead paper, no $H_2S$ produced. Growth produced no change of reaction in any of the media employed.

*Animal Inoculations:* Guinea pig inoculated subcutaneously with two cubic centimeters of twenty-four hour broth culture. Results, no apparent effect. Guinea pig inoculated in peritoneal cavity with two cubic centimeters of twenty-four hour broth culture. Result, no apparent effect. Rabbit inoculated in peritoneal cavity with two cubic centimeters of twenty-four hour culture. Result, no apparent effect.

The result of the above experiments would indicate that the germ found was a non-pathogenic organism, or at least one devoid of any active pathogenic properties since the inoculations made were productive of no effect upon the animals. A further series of experiments had been planned by which it was intended to prove this point more definitely and also to decide the question of the identity of the organism with one of the known forms, but by an unfortunate accident the cultures were destroyed and no further tests were possible.

* The term bacillus is used tentatively, the organism remaining unclassified.

Further material was unobtainable, a new house physician having promptly cured the patient without saving a second specimen of the fluid. By incision, irrigation and packing the galactocele was rapidly obliterated. Anaërobic cultures might have exhibited another microbe with gas forming propensities. The clinical history suggests the *bacillus mucosus capsulatus* as being most probably responsible, unless the organism described may hereafter be proved to belong to the aërogenous class For reasons which will immediately occur to bacteriologists, Dr. Berry considers this extremely unlikely, if not impossible.

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## XXXI. A SIMPLE METHOD FOR DETERMINING PERCENTAGES OF MILK IN HOME MODIFICATION

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Modification of milk on a percentage basis as introduced by Dr. Rotch, while exclusively used by a few physicians, has never come into general use, owing most likely to the fact that the method of obtaining such percentage modifications has never been made so simple as to be readily understood by busy physicians, only a part of whose practice consists in feeding babies. The many recent efforts to simplify modification have not been such as would appeal to most of this class of physicians. The methods by algebraic formulary, while good and accurate, involve study and practice, while the decimal method and all methods involving the use of milk sugar solutions are complicated. The advocacy of such methods has carried with it an inference of difficulty in obtaining exact percentages at home. Such inferences I believe to be entirely misleading, so that it has seemed desirable to bring clearly before the profession the simple mathemathical method of determining such percentages without formulæ and the advantage of this method.

The physician must, of course, know that good commercial milk ordinarily contains about four per cent. each of fat,* sugar and proteid. He should also know something about the percentage of fat in different sorts of cream, especially that the cream which forms on milk after it has stood in a refrigerator for twelve hours ordinarily contains about sixteen per cent. fat.

Having determined upon the chemical composition of the milk

* Can milk of cities may contain only about three per cent. fat, while the milk of Jersey cows may contain five per cent. or more.

he desires to use in any particular case, the number of feedings and the amount to be given at each feeding, he must first note the *relationship that exists between the fat and the proteid.* That is, whether the fat should be equal in amount to the proteid, or should be in the relation of two to one, or three to one, or four to one; and he should arrange his formula so that one of these four relationships between the fats and the proteids may be present. This will afford sufficient variety in formulæ and add cosiderably to the simplicity in obtaining the modification needed. If he wishes to use the fat in equal proportion to the proteids, it is evident that the relation in ordinary cows' milk would suit his case (see table 1) when simple dilution of this with water is all that is necessary, dilution with equal part water if he desires two per cent. of fat and proteid, with three parts water should he desire one per cent. fat and proteid. If, on the other hand, he wants a modification containing four times as much fat as proteid, it is evident that sixteen per cent. cream properly diluted will furnish him with the required proportions.

On the other hand, if he desires three times as much fat as proteid, he must have a twelve per cent. cream, which is easily obtained by taking two parts sixteen per cent. cream, and one part milk: or, if his fat is twice the amount of his proteid, he must have a cream containing eight per cent. fat, and easily obtained by combining one part sixteen per cent. cream with two parts milk. (See Table I.)

TABLE I.

*The Chemical Composition of Milk and Cream and the Method of Obtaining Percentage Creams from Gravity Cream.*

| | Fat. | Sugar. | Proteid. |
|---|---|---|---|
| Breast milk | 3 | 6 | 1 |
| | 4 | 7 | 2 |
| Cows' milk | 4 | 4 | 4 |
| Gravity cream, 16% cream | 16 | 4 | 4 |
| 2 part gravity cream | 16 | 4 | 4 |
| | 16 | 4 | 4 |
| 1 part milk | 4 | 4 | 4 |
| 3) | 36 | 12 | 12 |
| 12% cream | 12 | 4 | 4 |
| 1 part gravity cream | 16 | 4 | 4 |
| 2 parts milk | 4 | 4 | 4 |
| | 4 | 4 | 4 |
| 3) | 24 | 12 | 12 |
| 8% cream | 8 | 4 | 4 |

Suppose, for example, that we wish to feed a healthy infant of three months and require for each day ten three-ounce bottles of milk containing three per cent. fat, six per cent. sugar and one per cent. proteid, it is evident here that we need three times

as much fat as proteid, and that thus a twelve per cent. cream must be diluted with three parts water. (See Table II.)

TABLE II.

*Method of Obtaining Ten Three-Ounce Bottles or Thirty Ounces of Milk Containing Three Per Cent. Fat, Six Per Cent. Sugar and One Per Cent. Proteid.*

| | Fat. | Sugar. | Proteid. | | |
|---|---|---|---|---|---|
| ¼ 12% cream ... | 12 | 4 | 4 | 7½ oz. | 16% cream, 5 oz. |
| | 0 | 0 | 0 | | milk, 2½ oz. |
| ¾ water ..... | 0 | 0 | 0 | 20½ oz. | |
| | 0 | 0 | 0 | Lime water, 2 oz. | |
| | 4)12 | 4 | 4 | | |
| | 3 | 1 | 1 | | |
| Sugar add 5% ... | | 5 | | 5% of 30 oz., 1½ oz. | |
| | 3 | 6 | 1 | | |

Having thus obtained the desired twelve per cent. cream, giving a proportion of three parts fat to one of proteid, we obtain 3—1—1 by simply diluting with three parts water.

Thus we have the desired formulæ, except in the case of the sugar, which is only one per cent. instead of six. It is evident that five per cent. sugar must be added. The amount of sugar necessary for a day's food will thus depend upon the amount of milk we use. If this child is getting ten three-ounce bottles a day we will have a total of thirty ounces, to which five per cent. of sugar must be added, and five per cent. of thirty ounces being one and a half ounces, it is evident that one and a half ounces of sugar will be required for the whole thirty ounces. The sugar is most conveniently ordered from the druggist in packages, one of which suffices for one day's food. In the example I have just considered it would be ordered in packages of one and a half ounces each. Our day's feeding of thirty ounces will thus consist of one-fourth twelve per cent. cream, or seven and a half ounces, and three-fourths water, or twenty-one and a half ounces. Our twelve per cent. cream is composed of two-thirds sixteen per cent. cream, or five ounces, and one-third milk, or two and a half ounces. Our formula will thus read: Sixteen per cent. cream five ounces, milk two and a half ounces, water twenty-one and a half ounces, sugar one and a half ounces. If we use lime water to neutralize the milk, the amount added must be deducted from the amount of water used. Thus, in the above table, if we add one-fifteenth lime water it will be two ounces, and the water will be only nineteen and a half ounces.

Supposing, on the other hand, that our infant of three months is sick and it seems desirable to reduce the fats without altering the amount of proteids, and we consider that a modification containing one per cent. fat, six per cent. sugar and one per cent.

proteid is desirable. We have here a formula calling for equal parts fat and proteid, the relationship which approximately exists in ordinary cows' milk. The amount of fat and proteid, however, is only one-quarter of the amount present in cows' milk. It is evident then that we must dilute our cows' milk with three parts water. (See Table III.)

TABLE III.

*Method of Obtaining Ten Three-Ounce Bottles or Thirty Ounces of One Per Cent. Fat, Six Per Cent. Sugar and One Per Cent. Proteid.*

| | Fat. | Sugar. | Proteid. | |
|---|---|---|---|---|
| ¼ milk..... | 4 | 4 | 4 | 7½ oz. |
| ¾ water..... | 0 | 0 | 0 | |
| | 0 | 0 | 0 | 20½ oz. |
| | 0 | 0 | 0 | Lime water, ($\frac{1}{15}$) 2 oz. |
| | 4) 4 | 4 | 4 | |
| | 1 | 1 | 1 | |
| Sugar add 5%... | | 5 | | 5% of 30 oz., 1½ oz. |
| | 1 | 6 | 1 | |

Thus we get one per cent. fat, six per cent. sugar and one per cent. proteid. We must add again five per cent. sugar and five per cent. of the total feeding—thirty ounces is one and a half ounces. We will thus give this baby a fourth of thirty ounces milk or seven and a half ounces, three-quarters water or twenty-two and a half ounces, sugar of milk one and a half ounces. And again, if lime water is added, the amount of lime water will be deducted from the amount of water used.

Again, in feeding a baby of perhaps six months, a larger amount of stronger milk will be required, possibly seven feedings of eight ounces each of a modification containing four per cent. fat, seven per cent. sugar and two per cent. proteid. Here the relationship between the fat and the proteid is as two to one, and the same relationship that existed in the eight per cent. cream. As we have already stated, an eight per cent. cream may be obtained by mixing one part sixteen per cent. cream with two parts milk, and this mixture must be diluted with an equal part of water. (See Table IV.)

TABLE IV.

*Method of Obtaining Seven Eight-Ounce Bottles or Fifty-Six Ounces of Milk Containing Four Per Cent. Fat, Seven Per Cent. Sugar and Two Per Cent. Proteid.*

| | Fat. | Sugar. | Proteid. | |
|---|---|---|---|---|
| ½ 8% cream..... | 8 | 4 | 4 | 28 oz. { 16% cream, 9⅓ oz. milk, 18⅔ oz. |
| ½ water..... | 0 | 0 | 0 | 24 oz. |
| | 2) 8 | 4 | 4 | Lime water, ($\frac{1}{15}$) 4 oz. |
| | 4 | 2 | 2 | |
| Sugar add 5%... | | 5 | | 5% of 56 oz., 2.8 oz. |
| | 4 | 7 | 2 | |

Thus, for fifty-six ounces of this modification we will need half eight per cent. cream, which is made up of one part sixteen per cent. cream, and two parts milk. We will thus require twenty-eight ounces of eight per cent. cream, or nine and a third ounces of sixteen per cent. cream, and eighteen and two-thirds ounces of milk and twenty-eight ounces of water. If lime water is added it must again be deducted from the amount of water used, and five per cent. of sugar is again required. Five per cent. of fifty-six is two and eight-tenths; thus, for this case the milk sugar will be ordered in packages containing two ounces, six and a half drachms each.

For this modification of milk the mother has a graduate, one measuring thirty-two ounces being preferred, into which she pours the required amount of water and stirs in the sugar until it has dissolved. The cream, milk and lime water are afterwards added, the whole thoroughly mixed. This method is a simple one for the use of the physician and easily carried out by any intelligent woman.

In the foregoing the writer has given a bare outline of a method which allows of much amplification, but inasmuch as it is his desire to reduce it to its simplest form such amplification has been avoided. It is evident, however, that by different dilutions of cream with milk other percentage creams may be obtained as a ten per cent. cream from equal parts gravity cream and milk, and by diluting these by different proportions of water a great variety of modifications may be obtained. Neither originality nor absolute accuracy is claimed for this method.

*Summary.*—This method of obtaining percentages in modifying milk is simple and is applied as follows:

1. After having decided on the number of feedings for the twenty-four hours, the amount to be given at each feeding, and the formula of the food required, first determine the desired relation between the amount of fats and proteid and make a mixture in which these constituents exist in that proportion.
2. Dilute this mixture with the required amount of water.
3. Determine the percentage of sugar required for twenty-four hours' feeding and order the same in packages containing the required amount.
4. If lime water is added the amount so added must be deducted from the amount of water used.

# XXXII. A NEW SYMPTOM IN THE DIAGNOSIS OF DYSTOCIA DUE TO A SHORT UMBILICAL CORD

By SAMUEL M. BRICKNER, A. M., M. D.
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Since the early part of the last century there has been no question as to the difficulties to birth offered by a short umbilical cord; nor does it matter much whether the cord is naturally or absolutely short, as it is called when it is inherently so, or whether it is relatively or accidentally short, as it is termed when the cord is coiled about the fetus. When a birth is delayed for a reason which is not easily discoverable by the accoucheur, when he knows that all the elemental factors as to the size of the child, the capacity of the pelvis, the strength of the uterine contrac-

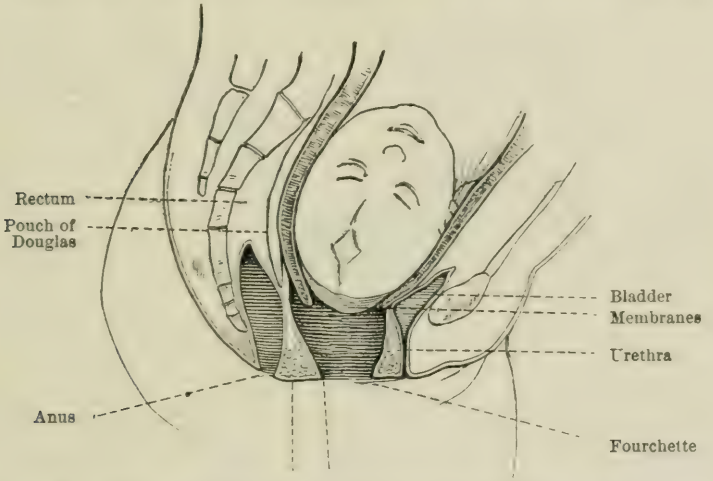


Fig. 1. First stage of labor; position of bladder and urethra unchanged. After Dakin.

tions, etc., are in harmonious relation, the diagnosis of the cause may remain unrecognized until the birth act is nearly completed, when it may be found to be due to an umbilical cord of minimal length, or to one wound so closely about the fetus that it becomes, by virtue of this fact, a short cord. Up to the present time no absolutely characteristic sign has been known by which it is possible to recognize an umbilical cord either inherently or accidentally short. Several symptoms have been described, to which I shall have occasion to refer later; but from a careful study of two cases, an analysis of which I shall presently give, I believe that I have observed a symptom which is

easily interpretable, which is significant of the condition and of no other, and which is logically explicable on anatomical and physiological grounds.

This symptom consists in the frequent, jerky discharge of urine in the intervals of the pains of the second stage—an act which is repeated as soon as the pain dies out, and is kept up until the fetal head reaches the vulva.

A moment's consideration of the anatomy of the soft parts at the beginning of the second stage of labor will make the explanation of the symptom clear. By the time that the second stage has become established the bladder lies entirely above the pelvis. As the second stage proceeds to its natural termination by the advance of the fetal head, the bladder becomes tightly

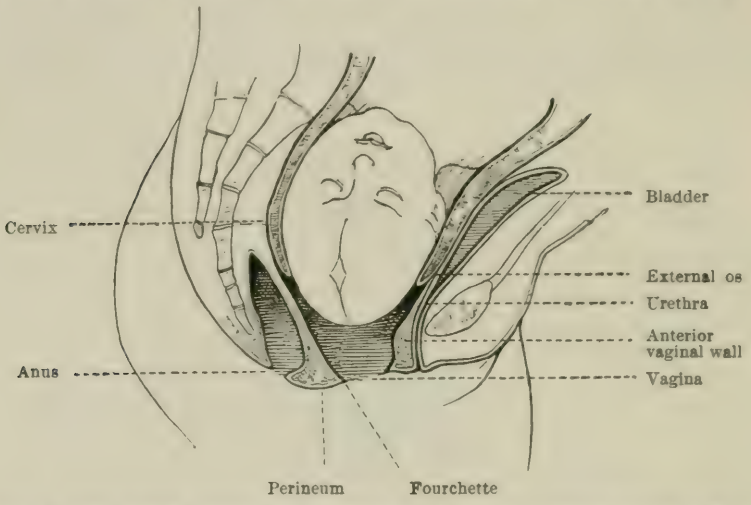


FIG. 2. Second stage, showing the altered position of the bladder, and the thickening of the uterine wall just above the bladder. A little later the urethra will become compressed and elongated when the head begins to compress the anterior vaginal wall. After Dakin.

pressed against the symphysis, lying parallel with it. At this time the urethra becomes compressed and elongated. To illustrate clinically the truth of this, I may mention how notoriously impossible it is to catheterize a patient at this time, and how equally impossible it is for the patient to urinate spontaneously. If, however, after this stage is reached, the head sharply recedes from its position—an event which all writers agree is common to both varieties of the short cord—the compression of the urethra ceases and the bladder again falls forward; and it is at this juncture that it empties itself in the characteristic manner of which I have spoken. That is, there is a sudden expulsion of a few drops of urine, all that has collected in the bladder since

the cessation of the pain previous. There is probably no doubt that the bladder is stimulated to this act by its alternate compression and relaxation, and that it is due to reflex action. This intermittent urination takes place until the head reaches the vulva, or a position so low in the genital tract that the retractive efforts of the short cord no longer are able to dislodge it to permit of the falling forward of the bladder, and the urethral compression is discontinued.

It adds something to the proof of the strength of my argument, I think, that the two cases in which this phenomenon was observed represented the two varieties of a short cord—the first, an absolutely short one: the second, one wound several times about the fetus. As I reported the first instance in detail in the *American Journal of the Medical Sciences* of November, 1899, when I first described this symptom, I shall give but a *resume* of it now.

Case I. *Elderly primipara; position L. O. A.; protracted first and second stages; short cord; separation of the placenta during labor; post-partum melancholia; umbilical hernia in child.*—Mrs. E. G. B., aged thirty-four years, married eight years, primigravida. Menstruation has always been regular but painful. There is no family or personal history of importance. There is no history of syphilis. The last menses appeared February 22, 1895. The predicted date of confinement was November 29, 1895. The pregnancy was uneventful. The urine was negative throughout. The feet and hands were somewhat swollen toward the end of the gestation, but there was no general edema. The patient was a stout woman, but not inordinately so; she was phlegmatic, stupid and exceedingly irritable. The pelvic measurements showed a pelvis somewhat larger than usual.

On December 3, 1895, she had a few false pains, with the discharge of some fluid, which I had no opportunity of seeing. At 8 p. m. December 6 labor began with infrequent and weak pains, and the patient remained in this condition until 1 p. m. of December 7, when she complained greatly of fatigue and begged to have the child taken from her. She was given a hypodermatic of one-quarter of a grain of morphine, after which she slept for two and one-half hours. At 5:40 p. m. labor pains again started in, weak and infrequent. The fetal heart was then beating at the rate of 140. At 10 p. m. the patient was given fifteen grains of the muriate of quinine. In half an hour the pains had become much stronger and more frequent. The cervix had almost disappeared, and at 11:30 p. m. the membranes were artificially ruptured, in the hope of hastening delivery. It was, however, 2 a. m., December 8 before the patient was fully in the second stage. The pains were now frequent and expulsive, and again and again the head could be seen at the vulva, only to be retracted as soon as the uterine contraction ceased. In the intervals between pains, as well as during a pain, bright arterial blood constantly escaped, but not in sufficient quantity to cause alarm or to weaken the patient. During the entire second stage the patient complained of pain over the left side of the uterus, at a point where I subsequently located the placenta. She urinated frequently during the begin-

ning of the second stage, *between pains*, passing a small quantity of urine at a time. At 5:30 a. m. a male child, weighing six and three-quarter pounds, was born, the head being peeled out of the labia and firmly held, despite the efforts of retraction, which ceased when the biparietals were in the vulva. The child was somewhat asphyxiated, having passed meconium for twenty minutes previous to its birth and being covered with it. It was easily resuscitated, the cord being tied at once.

The hand placed over the fundus immediately after the birth of the child could easily feel the placenta at its insertion on the left side of the uterus about midway between the fundus and the cervix. It was expelled with such ease twenty minutes later that I was convinced at the time that it had been lying loose in the uterus—an opinion which was confirmed by finding its maternal surface covered with a large and moderately thick clot. This condition also made clear the source of the hæmorrhage of arterial character during labor. The cervix, I might add, had not been torn. The placenta was the seat of marked calcareous degeneration. The cord measured, in its entirety, ten and one-half inches.

Convalescence was interrupted by a mild melancholia, which disappeared in two weeks. The child was noticed the following morning to have a marked protrusion at the umbilicus, which, after the dropping-off of the cord, presented a granulating surface. A month later it looked like a small collar button. Under the application of the solid silver stick and a compressing bandage it disappeared in four mouths. This protrusion was at first thought to be a Meckel's diverticulum, but a careful subsequent examination proved it to be an umbilical hernia. I believe that it was the direct result of the tremendous tension exerted upon the cord and its attachments at both ends during labor.

The delay in both the first and second stages can be credited without harshness, I believe, to the extreme brevity of the cord. The fact that the patient was an elderly primipara, who was somewhat stout, may have been an element of delay in the first stage, but it would be going far afield to attribute all the symptoms—the pain over the placental site, the arterial bleeding during labor, the recession of the head between pains, the frequent urination between pains, the umbilical hernia of the child—to anything but the fact that the cord was abnormally short, so short, in fact, that the child could just be born without artificial assistance.

Case II. *Multipara; position L. O. A.; protracted first stage due to early rupture of membranes; protracted second stage; cord twice about neck, once about shoulder; partial separation of placenta.*—Mrs. M. D. B., twenty-three years of age. She had one child three years ago, born with forceps. The cause of delay in this instance was probably due to uterine inertia. She was attended on this occasion by Drs. Jarman and Coe. Last menses, February 7, 1901. In March the patient presented herself with a retroverted gravid uterus. The uterus was reduced and a Hodge pessary inserted, which was worn until the fourth month of pregnancy. The pregnancy was otherwise uneventful, except for occasional nausea. The urine was negative throughout, the urea constant, and no abnormal elements present. The predicted date of confinement was November 18.

On November 8, 1901, the membranes ruptured spontaneously at 4 a. m. Labor pains came on soon afterward and were vigorous from the start.

Owing to the dry labor, the cervix was not wholly dilated until 9 p. m., when it was noticed that with the cessation of each labor pain the head receded sharply and that there was a slight flow of urine. This condition continued for nearly three hours, the urine being an almost constant accompaniment of the cessation of each pain. It was interesting to note that when the pains succeeded each other very rapidly, as they sometimes did, there was usually no escaping urine, the reason being that none had collected in the bladder in the short interval. From 11 o'clock on there was also a slight flow of bright red blood as each pain died out, and the patient complained of pain over the right side of the uterus. From these symptoms, especially from the striking discharge of urine, I made a diagnosis of a short cord at this time. When the head became very low in the vagina the recession ceased and the urination likewise, but there was still an occasional flow of blood. The birth of the head took place at 1:50 a. m. November 9, and the cord was found twice tightly coiled about the neck of the child. It was impossible to pull it over the head and it was therefore clamped in two places and cut. The birth proceeded without difficulty, but the cord was also coiled over the left shoulder. The child was somewhat asphyxiated, but was easily resuscitated. The placenta was removed fifteen minutes later by expression and was seen to have a considerable hæmorrhage upon a portion of its material surface, indicating a partial separation. The total length of the cord was twenty-two inches.

These two cases demonstrate clearly, it seems to me, the correctness of the assumption that when we observe frequent urination in the intervals of pain during the second stage, with recession of the head, we may safely diagnosticate a short or a shortened cord.

The question naturally suggests itself, what is a short cord? In reply we must admit that the relative length or shortness of the umbilical cord cannot be fixed. A cord which will allow of easy, unassisted birth in one case would in another be too short to permit of birth without help. To be a factor in the delay of labor the cord must be so short, measured from the umbilicus to its placental insertion, that the child cannot be born without one of several accidents being likely to happen. It is now quite generally agreed that ten inches is the minimal length of a cord which will allow birth to go on to its natural end without an accident. These accidents may be: rupture of the cord at any point in its length, but usually at its umbilical insertion; inversion of the uterus, or, as happened in the first case, an umbilical hernia in the child.

The placental location aids in determining the relative length or shortness of the cord. If the placenta lies low in the uterus, a cord which would prove too short were it higher in the uterine cavity is sufficiently long to permit of the birth of the fetus, and *vice versa*. The central or marginal insertion of the cord also plays an important rôle.

From a study of the literature it seems correct to state that the cord will break under a strain of between eight and nine pounds, and that the force of the uterine contractions during expulsive pains is about forty pounds, as given by Herman. It is, therefore, evident that the cord must be long enough during birth to allow the child's umbilicus to reach the vulva and slightly beyond it, or it will break, or will tear the cord from its umbilical insertion, or will tear the placenta from its place, producing hæmorrhage and death of the fetus or uterine inversion. The average length of the parturient canal, as given by Negrier, at the time of the expulsion of the fetus, is eight and three-quarter inches, so that we may assume that the limit of safety for the length of the cord is about ten inches—that is, a cord shorter than this would result in an accident of some kind. Kaltenbach believes that a cord of eight inches (twenty-two centimetres) is the limit of safety if the placenta has a low insertion into the uterus, while if the placental insertion is at the fundus he says the cord should be at least thirteen inches (thirty-five centimetres) in length. On purely anatomical grounds, however, we have seen that ten inches is not too long for an umbilical cord. We might phrase the matter so, that a cord to allow of absolute safety to mother and child should be at least ten inches in length from the vulva to its placental insertion.

We must give some consideration to the literature on the subject. Cases of a short or a shortened cord have been recorded by almost every writer on obstetric themes. Early in the nineteenth century Jorg, of Germany, and Denman noted the difficulties which were inherent in a short cord. Since that time their observations have been confirmed by numerous writers. Duncan, Lamare, Kaltenbach, Müller, Negrier, Turnbull, Herman, Davis and King have written considerably on the subject. In the thorough search of the literature rendered necessary by the writing of this paper I have failed to find, however, any mention of the symptom to which I have called your attention—the frequent urination between pains in the intervals of the second stage.

Probably the most characteristic phenomenon to be attributed to the short cord is the recession of the head with the dying out and disappearance of each pain. This is so striking, and so much more pronounced than the recession which naturally follows the cessation of uterine contraction during normal labor, that it arrests attention at once. It is not a slow retraction as we ordinarily see, but a jerky drawing back of the head. During labor the entire parturient canal diminishes in length with

the advent of uterine pains, increasing in length as the uterus relaxes, so that in all cases the head naturally recedes after a certain advance. When, however, in addition to the natural recession, there is added the elastic pull of an umbilical cord which will not permit the fetus to retain the full advance it has made, it is evident that not only will the head recede with the end of each pain, but that this recession will be so rapid and so constant that it will offer a striking feature in the delay of labor.

Duncan places considerable stress upon the complaint of pain by the patient over the placental area, and depression over the placental site, especially during the pull exerted by the forceps. This is noted in other cases when the forceps are applied, and may be due to peritoneal stretching. It is natural, when the cord is short to expect pain over the placenta, since it undergoes a pull or tug with each succeeding contraction of the uterus; for, although the entire genital canal diminishes in length with each pain, the child advancing despite the shortness of the cord, the tendency is present for the placenta to become freed from its uterine attachment. Actual *ablatio placentae* occurs when the cord is exceedingly short in all those instances in which the umbilical insertion does not give way. Partial separation occurred in both of my own cases. The fact that the recession of the head ceased upon the birth of the biparietals in the first case was unquestionably to be attributed to the loosening of the placenta and the consequent absence of further resistance.

Bleeding during labor which does not come from a placenta previa, or a torn cervix, or a tear in the vagina, should always direct attention toward the afterbirth. When the combination of symptoms is such as has been included in the present description, the cause may not unfruitfully be sought in a short cord. The bleeding will then appear in the absence of pains as well as when the uterus is contracting.

It might well be expected, in a condition in which there is an opposing influence on the accession of each pain to the advance of the fetus, that exhaustion of the uterus would ensue as a consequence; and, indeed, Napier regards uterine inertia as the symptom of a short cord—that this was lacking in my last case does not militate against its probability.

Denman, who is followed by King, lays stress upon another symptom of a short cord—the relief experienced by the patient's sitting up, as though to avail herself of the effects of gravity in delivering herself of her child. This symptom is of so varying a character that it is unwise, it seems to me, to lay special emphasis upon it.

Davis has recently called attention to the possibility of differ-

entiating between a short cord and one shortened by being coiled about the fetus. This lies in the umbilical murmur, which is present, he says, only when the cord is coiled about the child. After one has differentiated between the fetal heart sound, the placental bruit, the uterine bruit, and the mother's aorta, it must be a finely attuned ear which can recognize a murmur of the cord.

Summing up the evidence before us, I believe that it is a perfectly logical conclusion to draw that when we have the unusual symptom of urination or a discharge of urine during the intervals of pain during the second stage, especially at the beginning of the second stage, the attention of the accoucheur should be directed toward the shortness of the cord as the probable cause of this unusual clinical feature. He should be especially suspicious of this condition if there are a rapid and constant recession of the head during the intervals, arterial bleeding almost constantly, and one or more of the other symptoms noted.

Briefly to summarize the diagnostic points in the order of their importance, I would place them as follows:

1. Recession of the head in the intervals of pains.
2. Urination in small quantities in the intervals of pain after the establishment of the second stage.
3. Arterial bleeding during and between uterine contractions.
4. Pain over the placental site, especially during a uterine contraction or during the application of the forceps.
5. A desire of the patient to sit up.
6. Uterine inertia.

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# XXXIII. PUERPERAL HÆMORRHAGE

By GEORGE SEYMOUR, M. D.
UTICA

Puerperal hæmorrhage may be either normal or abnormal. The former may easily become the latter from simple or gross mismanagement during or after parturition. Hæmorrhage during or soon after the second stage of labor may be normal or abnormal. Hæmorrhages of any noticeable degree prior to the second stage of labor and excessive hæmorrhages during or subsequent to the second stage of labor, are pathologic and require remedial measures.

The etiology of abnormal puerperal hæmorrhage may be obscure or apparent.

The principal causes of antepartum hæmorrhage are: 1. Atony of muscles, blood vessels and nerves of the whole system, and especially of the uterus and its adnexa. This gives rise to hæmorrhages that seem to be only a menstrual return, but which are often really accidents in commencing frequencies. 2. Accidents giving rise to such physical disturbances as may come from excessive cohabitation, intense moral emotions, violent passion, injuries from falls, blows on the abdomen, coughing, vomiting, lifting heavy weights, etc. 3. Criminal or accidental abortion with retention of the whole or a part of the placenta. 4. Abnormal insertions of the placenta with the varied forms of placenta previa from the simple adhesions of the placental border down to the inner cervical ring to the implantation of the placenta centrally over the os interum, so that after dilatation of the os the placenta only can be felt. 5. Neoplasms of the uterine body, especially fibroids. Although the rule stands good that fibroid tumors creating hæmorrhage are usually preventive of conception, it often transpires that uterine myoma and pregnancy coexist, and hæmorrhage may arise therefrom before, during or after labor to such extent as to create a serious complication. 6. Ectopic pregnancies and hematoma.

Abnormal hæmorrhage during labor or postpartum hæmorrhage may occur from many causes mentioned among those of antepartum hæmorrhage, as for instance inertia, neoplasms and placenta previa, also from mismanagement of normal labor, inversion or rupture of the uterus, tearing of the cervix or perineum. One author, in "American Text-Book of Obstetrics," edited by Richard C. Norris, says: "Grave hæmorrhage during or

after the third stage of labor is rare.'' Another says that ''postpartum hæmorrhage is almost without exception the fault of the attendant.'' Such assertions savor not a little of self-adulation without large experience. A more rational statement on this subject is that of Lusk, who says ''postpartum hæmorrhage is not an uncommon event. The treatment of it is one of the most satisfactory departments of obstetrical practice.''

The writer has encountered within the past year no less than five cases of excessive postpartum hæmorrhage arising from no lack of thorough watchfulness by the attendant, which would have proved fatal had there not been prompt action at the time of their occurrence; also two cases of antepartum hæmorrhage complicated with uterine fibroids, resulting in early miscarriage. It is not too much to assert that normal puerperal hæmorrhage, though more often than otherwise inclined to grave results if improperly managed, should always be favorably prognosed and be so correctly managed as to be a simple physiological process with no grave manifestations or results.

To a large degree the same may be said of abnormal puerperal hæmorrhage. It can generally be so cared for as to insure safety to the patient and give credit to the attendant; nevertheless when the etiological factor is either placental previa centralis, inversion or rupture of the uterus, or a large uterine fibroid, there is possibility of the most skillful physician or surgeon being thwarted in his efforts and the patient becoming the victim of most disastrous consequences.

The beginner in practice, the man not best equipped for serious emergency, the man many miles from a good consultant, or the ignorant midwife, is as liable to meet with the serious cases of hæmorrhages at any time as the most experienced, best qualified and most thoroughly equipped obstetrician. The writer's first case of placenta previa occurred in his first year of practice, on a cold January day, six miles from town or any other physician. It was a case of twins. The mother and one baby survived. The other baby was still born. He who has faced these desperate cases alone, who has been obliged to act without delay, without deliberate preparation or assistance, knows full well that the keenest conception of the whole subject of puerperal hæmorrhage, the most complete knowledge and ability to best manage puerperal hæmorrhage is second to nothing in importance and interest throughout the whole realm of the practice of medicine. To successfully perform a delicate or capital operation of any character within the precincts of a well-equipped modern hospital is an amusing pastime compared with the conduct of an abnormal puerperal hæmorrhage in private practice unex-

pectedly encountered and arising from some one or more of the more serious causes already mentioned.

The treatment of normal hæmorrhages either antepartum or postpartum is most lucidly outlined and taught in many standard works on obstetrics and by a large number of professional teachers. Directions for the prophylaxis and management of abnormal hæmorrhages are most carefully set forth and most learnedly taught by the same sources of instruction, and yet it is not unappreciative or derogatory to say there is room for more light and knowledge and greater executive skill than is yet at the disposal of a majority of practitioners. The most favorable statistics given by hospitals, excluding rupture or inversion of the uterus, malignant or benign growths of the organ, lacerations of the cervix or vagina, and placenta previa, state that "mild postpartal hæmorrhage occurs once in 100 labors, severe once in 1,200 cases and fatal hæmorrhages once in 6,000. What the fatalities may be from the graver forms excluded in this estimate can not be readily estimated. They are no doubt very large, even with favorable hospital environments and the most skilled medical and surgical service.

It is easy to say we ought to do better work, there is room for improvement, there are plenty of opportunities at the front, but in this particular duty of treatment of puerperal hæmorrhage it may fairly be asked, how? when? and where?

A brief synopsis of the rules for management of puerperal hæmorrhage generally taught, accepted and practiced at the present time may be helpful towards further consideration and suggestion in reference to these questions. The central idea of controling hæmorrhage with the uterus uninjured and no deep wounds of adjacent parts is *secure uterine contraction*. This should always be encouraged by pressure on the abdomen over the uterus in the regular Crede method. To make provisions against abnormal hæmorrhage in the simplest of cases is wise and prudent. Early in the second stage of labor, have at hand a good syringe, preferably a fountain, a bed-pan, a pitcher of cold sterile water, a pitcher of hot sterile water, a bowl of small pieces of ice, a hypodermic syringe, hypodermic tablets of strychnine and morphia and normal liquid ergot. Failure of usual pressure to control hæmorrhage may then be followed quickly by lowering the head and shoulders, injection of ergot into the thigh, a douche of hot water into the uterus, introduction of the hand and possibly pieces of ice into the uterus. The application of iron to the inner uterine surface is recommended by many authors. I never use it. The faradic current of electricity if at hand may be resorted to with advantage. Pres-

sure on the abdominal aorta will control the rush of blood in emergency. An antiseptic gauze tamponade, with a reliable nurse to hold the uterus down for hours after contraction and cessation of abnormal hæmorrhage are secured, is the only safe condition in which to leave a patient during absence of the medical attendant.

There is quite a noticeable disposition and habit on the part of the teachers, writers and operators at the present time to delegate or assign to the gynecological surgeons many cases of abnormal puerperal hæmorrhage that are really obstetric cases. This is not a field that can be safely turned over at all times to the specialist alone. Every doctor who treats parturient women is liable to have thrust upon him at any time more or less responsibility concerning puerperal hæmorrhage. It is gratifying to realize, as we could not in the earlier professional life of many who are yet in active practice, that there are well-equipped hospitals and well-qualified modern surgeons in many cities and towns whose assistance can be secured when needed. Every recent graduate of these times and every "up-to-date" practitioner of obstetrics should be prepared at all times to conduct complicated labor cases and do minor gynecological work with thorough antiseptic precautions. The general rules already mentioned for managing most cases of normal and abnormal puerperal hæmorrhage, either antepartum or postpartum, must sometimes be seconded by further measures of an operative character.

In all cases of abortion it is imperative that the uterus be emptied by careful curettage if nature does not fully accomplish that object within a comparatively short time. No woman with retained placenta is secure from hæmorrhage which may be exhaustive and, if attended with sepsis, dangerous to life.

Puerperal hæmorrhage incited by neoplasms, whether benign or malignant, often opens up a question of expediency which may be solved by resort to simple methods of hæmostatics, or lead to major surgical procedures like Cæsarian section, hysterectomy, or the Porro operation.

Lacerations of the cervix and perineum must sooner or later have surgical repair and, if indicated at the time of their occurrence, the one in attendance should be the selected operator. Inversion must be followed by immediate reduction or it soon becomes a case for a capital operation.

Rupture of the uterus and pelvic hæmatoma are often appalling in their sequels, even with the best medical and surgical attention promptly rendered.

Placenta previa from the first instant of discovery is a merci-

less warning to the stoutest heart that dire results will surely follow if the right thing is not done at the right time. The earlier and more certain the diagnosis of placenta previa is made, the more secure is the life of both mother and child. If the accoucheur has thoughtfulness to examine the patient in the early months of pregnancy, and at frequent intervals thereafter, and possesses the tactile dexterity of touch to diagnose placental displacement to the proximity of, or at the internal os before dilatation or hæmorrhage appears, or if he diagnose the trouble in the incipient stage of hæmorrhage when there is but slight dilatation of the cervix, a great point is gained and he may elect the treatment most promising to the safety of mother and child. If his first knowledge of the trouble comes to him any time after the seventh month of gestation, with a dilated os and a torrent of blood, there is little time for deliberation or election of method. The customary habit in vogue for centuries of temporary tamponade followed soon after by instrumental or manual delivery, preferably accouchment force and podalic version are the routine methods of procedure. The life of the child is sacrificed, and if the mother lives it is deemed commendable practice. With the exception of the introduction of asepsis and antisepsis in obstetrical practice there has been comparatively no advance in the treatment of placenta previa for a long time past until within the past few years, during which some clear-headed and accomplished surgeons have made a bold stand for resort to Cæsarian section in selected cases of placenta previa with favorable environment for the performance of the operation.

Statistics and opinions on record for or against Cæsarian section in placenta previa are so scattered and lacking in conclusiveness to the satisfaction of the profession at large that I shall not attempt to reproduce them here.

Why should there not be advance in the line of saving babies as well as in other branches of medicine and surgery? Cæsarian section and symphysiotomy in cases of deformed pelvis are fast improving the records of babies unsacrificed and mothers humanely treated and saved. Why may not the same be true of placenta previa? If Cæsarian section can be done as safely for the mother as podalic version, and to this can be added the reasonable assurance of saving the life of the child which is almost invariably sacrificed in podalic version, why should it not be done? In the *New York Medical Journal* for November 3, 1900, is published a really classical paper by that brilliant surgeon and teacher, Dr. A. Palmer Dudley, of New York, entitled "Ideal Method of Treatment of Placenta Previa." It is a most satisfactory presentation of the subject in favor of this surgical

innovation. The following, quoted by Dr. Dudley, states the case clearly: "When the mother is in good condition, uninfected, not exhausted by long labor, or by prolonged efforts at instrumental delivery, the Cæsarian section is so safe an operation that it may resorted to unhesitatingly." That the writer may not be accused of having read or studied but one side of this topic, he begs to say that he has searched a large number of journals and some of the most recent text-books for points and evidence both pro and con; and for fairness would refer to a paper by Dr. Eherenfest on "the Impropriety of Cæsarian Section in Placenta Previa," published in *American Medicine* of January 11, 1902. The latter summarizes his paper first by flatly repudiating the statistics he quotes in saying "the results of Cæsarian section at large are worse than is usually stated." and then gives much emphasis to what he terms *his* method, which he teaches and which we all know is almost as old as the oldest medical literature and teaching and has been found wanting for many, many years where real saving of the lives of mothers and children has been the object sought.

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## XXXIV. WHAT SHALL BE DONE WITH THE PROFESSIONAL MIDWIFE?

By MAURICE J. LEWI, M. D.

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Figures furnished by the Department of Health of the City of New York, show that during the year 1901, 80,735 births were reported, of which number 42,253 were reported by physicians, and 38,482 by midwives. The figures for the preceding years are very much the same as those just quoted.

Personal investigation through the medium of prominent physicians in the city of New York shows an undivided opinion based upon their experience that great evils are wrought to the community by reason of the incapacity and the negligence of these midwives. It is a difficult matter to determine just how many cases of disease and deformity are properly chargeable to incompetency on the part of midwives at the bedside of the lying-in woman and at the birth of the child. Suffice it, our hospitals and dispensaries are daily witnesses to the criminality which permits ignorant women to act as medical guardians at

the birth of the child. The consensus of opinion which holds this ignorance responsible for the many cases of ophthalmia neonatorum, and of ruptured perineums and of lacerated ora uterorum, is a conclusion well worthy of recognition, for it is unbiased and is gleaned from the actual experience of scientific men who lead in their several specialties.

By reason of the public lack of knowledge of the subject it has ever devolved on the medical profession to correct sanitary and health abuses, and, as heretofore, the laity expects the profession of medicine through its accredited society or societies to point out the remedy when the law makers may be expected to act. The difficulty up to this time in consummating a correction of this abuse, and a mitigation of this suffering has been due to a lack of unanimity on the part of the doctors as to method and manner.

Those opposed to interference state: "If you legalize these midwives, you permit uneducated persons to practice a branch of medicine which practice requires more knowledge than the educated midwife can possess." The other faction has said: "Educate these midwives as they are educated in Europe and there will be a mitigation of existing evils." The ideal method would, of course, be that which would make it legally necessary for one practicing midwifery to be possessed of the knowledge essential to practice medicine generally. But such a view is Utopian as long as the cities of this country are filled with a cosmopolitan population carrying with them to their new homes the old ideas regarding the need for midwives, and so long as no law other than a health board regulation, necessarily more honored in the breach than in the observance, is the only trip encountered by the would-be practitioner of midwifery, so long will there be women to be delivered by midwives in preference to doctors, and so long will there be midwives who are ignorant.

We cannot perch ourselves on an eminence and look down upon the world and say: "You must come to our views, you who are suffering because of these abuses." But those of the profession who have all along hoped that this reckless practice of midwifery should be corrected by legislation calling for an abandonment of midwifery practice, by all not licensed to practice medicine, must cease from hoping for such an outcome. We are confronted with a condition, not a theory. We know that the asylums for the blind are being crowded with children rendered sightless because of neglect, criminal or otherwise, of these midwives. We know that dispensaries and hospitals are daily crowded with women who have been maimed and crippled because of the neglect or otherwise of this same class of people.

We know that abortions are being daily committed by women advertising themselves as professional midwives. We know that the farming out of children is being carried on by means of this same class. Is it not high time that the medical profession of the State of New York should step in and demand an abatement of the conditions enumerated? Unitedly presenting our views to the legislature, is it not reasonable to expect that the legislature would come to the rescue? And would not a mitigation of these evils bring credit to the medical profession, if through its initiative this reform were accomplished? And just as we would be honored for bringing this to pass, so are we to-day discredited, not by the laity, for they do not understand the situation, but by the thinking part of the profession which feels that each blind child, rendered so by failure on the part of the profession to intelligently regulate the practice of midwifery, is a crime for which the profession is responsible.

To quarrel about details thereby preventing the consummation of a corrective law, is as wrong as it would be for the various religious sects to quarrel with one another as to their creeds at the portals of heaven. The remedy:

Let the profession unite in petitioning the legislature to pass a law that on and after a given date no person shall be permitted to practice midwifery unless previously registered as having attended at least ten cases of confinement; who is not licensed so to practice after examinations to be conducted on given topics, under rules and regulations to be formulated by the Regents of the University of the State of New York, or by the State Board of Health, as you will. The verbiage of this bill could be simple and still effective. It need not take up more space than a stick in a newspaper column.

This cavilling as to whose function it is to attend cases of this character, the plaint of the sentimentalist in medicine that the profession is being insulted by recognizing legally those who carry on this practice, and all other fancies, should be set aside and the great thought kept in mind that the public is entitled to a better condition of affairs, and that crime and physical wreck in the name of midwifery should cease.

# XXXV. THE CIVILIZED INDIAN, HIS PHYSICAL CHARACTERISTICS AND SOME OF HIS DISEASES

By A. D. LAKE, M. D.

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It is the aim of the writer to describe briefly the present physical condition of the descendants of the once powerful Iroquois Confederacy, a government of which it is said that when Europeans first became acquainted with the people of whom it was composed they were filled with admiration because of its wisdom and strength, and called them the "Romans of the New World." It is stated that their form of government was a model upon which our own was very largely formed. In originating and maintaining through many decades this first known republic in America they gave notable evidence of large prowess and intelligence.

Individually they were splendid examples of nearly perfect physique, which condition was maintained by thorough athletic training when not engaged in war or hunting. Every member of a tribe was a soldier, always thoroughly drilled for combat. The cultivation of the soil, as well as the preparation of the food, was left to the women, who were, from the necessary muscular exertion, also kept in good physical condition. During the summer they wore scarcely any clothing, and in the winter time they were clothed with the skins of animals. The food was of the most simple character, composed of game and the cereals. They lived during a portion of the year in the open air. The tepee, which afforded them shelter during the cold season, was simply poles covered with skins, with many openings allowing ingress of air and escape of smoke. They were inured to vicissitudes and hardships and taught that to complain of pain was evidence of cowardice which, to them, was a crime. They put in practice a system of personal hygiene, which was a part of their religion. They lived close to nature and thus became splendid examples of the natural men and women. They were honest, truthful, and, though savage and fond of warfare, the first instance of treachery and deception known in their history was shown by them only after repeated lessons, in this respect, given them by the white settlers. So far as any history can be obtained, the diseases now so common among their descendants were largely unknown to them. Parturition was accomplished

with little pain and there was no confinement from the women's duties. Menstruation was also painless, and its first occurrence was at a later age than at present.

This, briefly, may be said to represent their physical condition with the first encroachments of civilization. Since that time they have become degenerate and feeble, both as a race and as individuals. Their power of resistance against disease is at low ebb, and they furnish an excellent illustration of what must ever be the course of a decaying race. All of this, it is apparent, has been brought about by the change which the occupancy of this country, by the white man, has forced upon them. It is easily understood that this change must have involved most vital conditions to them. Dispossessed of the land upon which they hunted and fished, and thus deprived of this occupation, they were forced into idleness and soon suffered from the effects of the loss of their accustomed exercise, with surely resulting physical impairment, which condition became confirmed and established as the habit of indolence grew upon them. Their habitations were speedily changed from the well ventilated tepee to something approaching in appearance the house of their white neighbors. It was, however, in most instances only a small hut built of logs and bark, very largely excluding the light and air. Their food rapidly changed from its primitive form, both from the disappearance of game and also from their desire to apply the culinary arts of the white man to themselves. Through conquest they were deprived of their national power and spirit of independence, which, without question, had something to do in lowering racial vitality, and secondarily, that of the individual. But above all things the most prominent cause of their degeneracy is to be found in the importation of diseases of Europeans, and the use of alcoholics which they learned from the white man, and which, throughout their whole career, has produced most deleterious effects both physically and morally.

These causes, with others, have contributed in bringing about the present condition of deterioration, or rather the condition existing twenty or thirty years ago, for since that time there has been some improvement. At the time above stated, and very largely at the present time, one is impressed with the imperfect and poorly developed physique of the children, which is also well marked, although to a less degree, with the adults. This is especially characteristic of the males. The Indian woman, as a rule, presents a more vigorous appearance and evidence of larger vitality. There has been a decided decrease in height since the earlier recorded measurements. A man six feet or more in height is rarely seen. Chest measurements are smaller

and the average chest expansion is less than that of the white man.

There is a decided tendency toward corpulency; this condition, always well marked with the older females, was in their early history uncommon with the males. At the present time it is very frequent with them. They are easily fatigued on exertion, and while engaged in games of ball, after running rapidly for a short time, their respiration is increased to such extent that it becomes fairly laborious. The same condition is observed in the dances which form a part of the pagan ceremonies, still maintained, to some extent, among them. The surrounding farmers find it impossible to obtain the same amount of work from the Indians whom they employ that they get from white laborers, and this applies to the more industrious class who are willing to work. The larger number cannot endure any form of severe labor without speedy exhaustion.

They are extremely sensitive to change of temperature, and the late fall and the winter months is a very disastrous time with them. Influenza, bronchitis and pneumonia are exceedingly prevalent and very fatal. Many of them occupy miserable habitations, frequently a hut in which a family of half a dozen or more are crowded into a room twelve feet square, occupying it day and night. Their sanitary surroundings are most unhealthful. They live largely upon a poorly cooked, mostly vegetable, diet, the only meat which most of them are able to procure being salt pork.

Drunkenness is very prevalent and many of their diseases are directly traceable to the use of alcoholics. The habit is acquired, in many instances, at an early age and seems to more completely control the individual than it does with any other people. With many of them a large part of all their earnings is spent for intoxicants.

The population of the Cattaraugus reservation is about 1,800, and during the past twenty years there has been but little variation from this number. The death rate is very large, as is also the increase from birth. About 100 die each year from some form of tuberculosis. Consumption occurs among them from early infancy. There is good reason to believe that one-third of the children die of this disease, or some other form of tuberculosis, before the age of five years. If they pass this age in safety they are likely to enjoy immunity until they reach puberty, at which time, especially with the females, there is great fatality. Young men and women, who, perhaps, a few months before were in good health, come for treatment for some indefinite complaint, and upon examination are found with tuberculous lungs. Whole

families die from this disease within a few years, and were it not for their wonderful fecundity the whole race would speedily become extinct from this cause alone. A slight attack of bronchitis, which affection is far more common with them than with the white people, is sufficient to lay the foundation of phthisis. The same is true of measles and whooping-cough. It is very rare for pneumonia in the adult to be followed by recovery. For if the patient survives the acute stage of disease he almost certainly becomes the victim of acute or chronic tuberculosis.

From their poor sanitary condition, insufficient diet and inability to provide proper care and treatment, consumption tends more rapidly to a fatal termination than with the white people.

Different forms of tuberculosis exist about as follows: First in order of frequency stands affected glands, internal and external, next follow tubercular conjunctivitis, with frequent corneal ulcers, eczema, cold abscess, tuberculosis of the lungs, tuberculosis of bones and joints. In the last named it is not at all uncommon to observe cases, where long continued suppuration, with open sinuses and extensive destruction of bone and joint structure, have existed for long periods, to be followed by complete recovery. Many of these cases have been followed by ankylosis, lasting for months, but often, in time, permitting of motion and with resulting useful joint. It is to be noted that few of these cases bear operation well. In several instances resection of a diseased joint or an amputation has been followed by the appearance of tubercular trouble in the lungs, or elsewhere, with a fatal result.

The history of syphilis among these Indians presents many interesting features, the most important being their present immunity. It is very rare to find a case of the primary disease among them at the present time. Gonorrhœa is very prevalent, making it evident that the opportunity for the contraction of venereal disease exists to a large extent, but they no longer seem susceptible to syphilitic infection. Twenty years ago the evidences of its previous existence were frequently seen in cicatrices, the result of primary and secondary lesions, and in other conditions showing the former systemic infection. According to the account given by the older Indians, and by two aged physicians who had practiced among them, forty years previous to the time stated syphilis was very prevalent. It was stated by one of these physicians that hardly a family on the reservation escaped its ravages. The epidemic, if such it may be called, continued for ten or fifteen years, since which time it has gradually grown less frequent until the present time, when it has almost entirely disappeared. There is no doubt it has left its

impress upon the people in added physical degeneracy. It was called by them the "Bad Disease," and they frequently ascribe their present chronic diseases to its previous existence in their families.

Another interesting fact, developed in connection with their syphilitic history, is the apparent recovery of many individuals from all stages of the disease, without treatment, or if any remedies were used they were confined to the roots and herbs indigenous to the reservation and prescribed by their native medicine men. Many years ago one would often see persons, among the older people, presenting the evidences of extensive syphilitic ulcerations, and who gave a history of the disease from the primary lesion, through the secondary and even tertiary stage, who state that throughout the whole course of the affection they have had, at no time, any form of treatment, yet they have, to all appearances, fully recovered. It does not appear, from a careful inquiry into any instances of this natural history of syphilis that recovery ensued, in any case, under a less period than two years. Probably the average duration was much longer. It is apparent that syphilis among these Indians, persuing its course unrestrained and uninfluenced by remedies, has, undoubtedly, in all cases, passed into the secondary stage. During the secondary stage there has been a constant tendency toward recovery, which, in most instances, has taken place. With a less number the disease has reached the tertiary stage, to be also, in many instances followed by recovery. No doubt in many cases there has been such extensive destruction of tissue, and so much mal-nutrition induced, that a fatal result was inevitable, while more often still death has resulted from some intercurrent affection. Still the fact remains that the tendency has been to recovery.

The results of the growth of civilization upon this people is shown prominently in the health of the women. There is a constant increase in the diseases peculiar to their sex. While the older women state that painful menstruation was almost entirely unknown to them, it is very common with the younger women. It is only within recent years that secondary disease of the uterus and appendages, the result of gonorrhœa, has been recognized with them. Whether or not this disease has existed with them since a remote period, it is very certain that it has never been so prevalent as at the present time. It is wide-spread on the various reservations and no means are employed or can be enforced to prevent its dissemination. It is often seen in boys and girls from the age of fifteen years, and it is not unusual to find cases in which the disease has existed for years. There

is reason to believe that it is a potent cause of sterility, which condition must increase with the continuance of the disease. Its effect upon the future of the race is a factor of prime importance.

Nervous diseases are infrequent, but more common than formerly. Some cases of hysteria have been observed mostly with the girls at school. Insanity is of rare occurrence.

As before stated, there has been some improvement in the physical condition of these Indians during the past twenty years. This is most marked in the decrease of the number of tubercular diseases and lessened fatality from this cause. There is also a decided decrease in the number of cases of infantile diseases. It is most interesting to trace the probable cause of this betterment. One evident factor is to be found in the effect upon the people of the education and training given in the various institutions which receive and care for Indian children. The State of New York has maintained for many years, on the Cattaraugus reservation, an asylum devoted to the care and education of orphan and destitute Indian children. At this institution one hundred beneficiaries are maintained, educated and trained in useful occupations. During a large portion of the time of its existence its buildings were of limited capacity and its dormitories and living rooms were crowded, reducing the air space to less than one-half that which now is now required by law in this State. At this time the annual death rate, principally from tuberculosis, was from three to five out of the 100 children. Five years ago, by more liberal appropriations of the legislature, the managers were enabled to supply larger and better buildings, with modern sanitary appliances. The result, in lowered death rate and generally increased healthfulness, has been marvelous. In fact, there has been but one death in three years past. This institution is receiving children from an early age and taking care of them until they are seventeen years old, when homes are found for them, if possible, outside of the reservation. It thus becomes a most potent factor in protecting them from the encroachment of disease at the time of greatest danger.

A large number of children are cared for in like manner at Carlisle and Hampton. In all of these schools manual training is made an important part of the curriculum, but above all things, in the production of good results has been the adoption of thorough and systematic athletics. Its effects are speedily seen in better physical development and lessened tendency to the development of those diseases to which they are strongly predisposed. The result of this method of education has been to return to the reservations, a large number of young men and

women, thoroughly trained in all lines which tend to physical upbuilding, and it is not at all difficult to understand that the race is being largely preserved through the work of these beneficent institutions. It would seem, therefore, from the good which has already been accomplished, that the physical regeneration of the Indian is not an impossible task. Is it not reasonable, also, to believe that moral and mental improvement will follow efforts to raise the physical standard?

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## XXXVI. TENDON TRANSPLANTATION IN THE TREATMENT OF PARALYTIC DEFORMITIES

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Until within the last decade no chapter of surgery has been more unsatisfactory in its results than the treatment of paralytic deformities. From early times attempts have been made to supply by means of a great variety of apparatus the functions lost as a result of paralysis or injuries of muscles, nerves and tendons. In a few instances these attempts have been fairly successful, but in the vast majority of cases the results have been unsatisfactory and the atrophy of the muscles incident to the use of many forms of apparatus a decided disadvantage. A great advance was made in the treatment of certain paralytic deformities when Albert proposed and practiced arthrodesis. The operation soon became a popular one, as evidenced by the amount of literature upon the subject. While in many instances arthrodesis improved the condition of the paralyzed member, nevertheless the results were far from satisfactory.

The introduction of tendon transplantation in the treatment of paralytic deformities was unquestionably the greatest advance ever made in the management of this class of cases. The credit for this brilliant idea has usually been accorded to Nicoladoni, but in reality belongs to Duplay, who in 1876 employed the procedure in the treatment of a case of traumatic loss of function of the arm. Nicoladoni, however, in 1881 first transplanted healthy tendons to correct a talipes calcaneus deformity resulting from a complete paralysis of the calf muscles and an almost complete paralysis of the flexors of the foot. He divided the tendons of both peronei muscles and attached them to the tendo Achillis, splitting the tendo Achillis upward for eight centimeters, and attaching the tendons of the peronei between the

split portions. The result was most satisfactory, and Nicoladoni expressed the view that the transplantation of healthy tendons would be of much value in the treatment of cases of pes equinus paralyticus. Hacker in 1886 reported a favorable result in a case similar to Nicoladoni's. Lipburger in 1889 sutured the tendon of the gastrocnemius to the peripheral end of the traumatically severed tendons of the peronei, and thus corrected a varus deformity. For practically ten years after the publication of Nicoladoni's article the procedure advocated by Duplay and himself attracted no attention.

In 1892 Brobnik reported seven cases in which favorable results had followed the transplantation of tendons in the treatment of paralytic deformities. Among this number Drobnik reported the first case of tendon transplantation for the treatment of a paralytic deformity of the hand. As a result of an infantile spinal paralysis, the child sustained a palsy of the extensor digitorum communis, the extensor carpi ulnaris, the interossei and the abductor pollicis muscles. Marked improvement followed the transplantation of the tendon of the extensor carpi radialis to the extensor digitorum communis. Phocas in 1893 reported a favorable result in a case of talipes calcaneus paralyticus in which he transplanted one of the peroneal tendons to the tendo Achillis. Winkelmann in 1894 reported a favorable result in a case in which he sutured the tendon of the gastrocnemius to the peripheral end of the paralyzed peroneus longus and then sutured the tendon of the paralyzed peroneus brevis to that of the longus.

The first to practice tendon transplantation in America was Parrish, of New York, who in 1892 reported a favorable result in a case of pes valgus paralyticus. He was followed by Milliken, of New York, who in 1895 reported one case of successful transplantation of a part of the tendon of the extensor hallucis to the tibialis anticus. In 1896 he reported nine further cases, among the number being two cases of transplantation of the sartorius to the paralyzed quadriceps extensor tendon, one of which was successful. Milliken seems to have labored under the idea that the procedure of transplanting healthy tendons was an original one with himself. Ghillini in 1895 reported a favorable result in a case of pes valgus paralyticus in which he sutured the tendon of the peroneus longus to the tendon of the tibialis anticus. Krynski in 1895 reported a case of traumatic severing of the flexor tendon of the right middle finger in which it was impossible to unite the severed ends. The distal portion of the tendon was, however, sutured to the neighboring flexor tendon of the index finger, and a good result was obtained.

Since 1896 a considerable number of articles have appeared upon the subject, and a large number of satisfactory results have been reported. Franke in 1896 collected fifteen cases from the literature and reported two of his own, in all of which the results were satisfactory. Goldthwait, of Boston, in 1896 published a very excellent article upon the subject, in which he discussed the operation in considerable detail, and outlined a method of suturing the tendons which has been very generally adopted. He reported four cases in all of which the results were very satisfactory. Bradford, of Boston, in 1897 published an article upon the subject of tendon surgery, in which he devoted considerable attention to the subject of tendon transplantation and strongly recommended its use in the treatment of paralytic deformities.

Eve in 1898 published the first article in England upon the subject of tendon transplantation. He discussed in considerable detail the technique of the operation, and reported four cases of paralytic deformities of the feet in all of which the results of tendon transplantation were most satisfactory. Brunner and Schultess in 1898 reported two cases of paralytic deformities of the feet and one of the hand, all of which were greatly improved by tendon transplantation.

Gocht in 1899 reported eighteen cases from Hoffa's clinic; three of peripheral paralysis, thirteen of spinal infantile paralysis, one of cerebral infantile paralysis and one of a spastic condition of the legs. In all of these cases tendon transplantation was practiced with very satisfactory results. Keiler in 1899 reported an excellent result in a girl of eighteen, a case of extensive tendon transplantation in the arm to correct a marked paralysis following a hemiplegia at two years of age. Ludwig in 1899 reported nine cases of successful tendon transplantation from the clinic of Mikulicz.

Lange in 1900 reported six successful cases, three of paralytic deformities of the feet and three of paralysis of the quadriceps extensor muscles, in all of which he obtained excellent results. Vulpius has published by far the greatest number of cases; his latest communication in 1900 included the report of 160 cases upon which he had operated and the results of which have made him a most enthusiastic advocate of the procedure. Kunik, Coolidge, Cone, Tubby and Noehte in the past year have also published articles urging strongly the more general employment of tendon transplantation, and reporting a number of satisfactory results.

From a brief survey of the literature upon the subject it is apparent that tendon transplantation has aroused but compara-

tively little interest in America, the communications upon the subject being limited to those of Parrish, Milliken, Goldthwait, Bradford, Townsend, Coolidge and Cone. On the continent, however, the interest manifested in the subject has progressively increased, until to-day the operation is practiced in practically all of the large continental clinics, and the universal sentiment of all who have employed the procedure is decidedly in its favor.

The conditions in which tendon transplantation is indicated may be grouped under four general headings: (1) traumatic loss of muscles and tendons; (2) spinal infantile paralysis; (3) spastic paralysis, Little's disease, cerebral infantile paralysis, hemiplegia; (4) congenital deformities, especially club foot.

Spinal infantile paralysis is by far the most common variety of paralysis amenable to treatment by tendon transplantation. The very frequent occurrence of this disease among young children furnishes an abundance of material of this character. They are also the cases most suitable for operation, for the paralysis is but rarely a complete one; usually a single muscle or a group of muscles is alone involved and the legs are more often affected than the arms. Furthermore, Vulpius has demonstrated that complete paralysis occurs only infrequently, and is by no means always present when all active motion is gone. In cases of partial paralysis, tendon transplantation is especially indicated, while in cases of almost complete paralysis one must choose between arthrodesis, tendon transplantation and apparatus. The more circumscribed the paralysis, the closer the proximity of healthy muscles and tendons, the more satisfactory will be the result. The conditions are most favorable about the foot and lower leg, because the tendons are well formed and are situated comparatively near to each other. The conditions in the upper leg are less favorable and those in the arm still less. Cases especially suited for operation are those in which a group of muscles has been partially or completely paralyzed and the antagonistic group is normal or approximately so.

Certain cases of congenital club foot are associated with a weakness of certain groups of muscles, and in those cases tendon transplantation is often useful in helping to maintain the foot in the corrected position and to establish a more nearly normal equilibrium of action of the muscles.

The question as to when to operate upon cases of paralysis is usually an easy one to decide. So long as there is any evidence of spontaneous improvement, one should refrain from operation and should employ the usual means indicated in such cases, namely,—massage, gymnastics and electricity. Spontaneous improvement usually ceases from one to two years after the acute

attack. When for some months no further improvement has been noticed, or when for any reason the deformity is growing more marked, operation is indicated. In certain partial paralyses the power remaining in the unaffected or partially affected muscles may be a decided disadvantage, owing to the fact that their antagonists being paralyzed, the part is pulled more or less out of its normal position, and under such conditions the deformity often tends to gradually grow worse. When such a condition has existed for some considerable period there is a marked tendency toward the development of a bone deformity, the bones of the part tending to shape themselves in conformity with the new position of the part.

A thorough knowledge of the anatomy of the part and of the function of the muscles is absolutely necessary, and in every instance a most careful examination of the paralyzed member should be made to determine what muscles are paralyzed, what muscles need strengthening and what muscles can be used. If possible, careful electrical tests of the reaction of the muscles should be made, for only in this way can an accurate estimate be formed of the condition to be dealt with.

The usual deformities of the feet resulting from paralysis of certain groups of muscles are pes calcaneus, pes equinus, pes equino-varus, pes equino-valgus and pes valgus. In certain cases of long standing, when a pronounced deformity has developed, it is often desirable to correct, so far as possible, the deformity by means of tenotomy and manual redressment, keeping the member in plaster for a considerable period of time as a preliminary to the transplantation of the tendons later.

The technique of the operation varies with the muscles paralyzed. It is, however absolutely necessary that some one group or part of a group of muscles be possessed of a moderate amount of power. Each case requires separate consideration, and a certain amount of mechanical ingenuity must be exercised. In some cases it is advisable, if possible, to select for the transplantation a muscle whose action resembles as closely as possible that of the paralyzed muscles, both because such muscles are usually situated nearest to the paralyzed muscles as well as because voluntary function is apt to be restored more readily. In other cases, however, it is advisable to select one of the antagonists for transplantation, in which instance the result is twofold, that is, the restoration of the paralyzed function and the lessening of the action of the antagonists, which tend to produce the deformity. The incision to be employed will differ with the case and with the tendons to be exposed. Vulpius advises the use of free incisions in order that the condition of the muscles

may be inspected and an estimate formed of the extent of the degeneration. Eve, on the other hand, advises against long incisions in the feet, because of interference with the venous circulation and the subsequent œdema.

Four different methods of tendon transplantation have been employed: The simplest method consists in dividing the tendon of a healthy muscle and suturing its central portion to the tendon of a paralyzed muscle. The chief objection to this method is the sacrifice of the normal function of the transplanted tendon.

The second method consists in dividing the tendon of the paralyzed muscle and attaching its peripheral portion to the tendon of a healthy muscle. This method has been called by Vulpius the ascending transplantation. Hoffa, on the other hand, prefers to call it the passive method, because an inactive passive tendon is transplanted to a normal, or active one.

The third method consists in splitting the tendon of a healthy muscle and transplanting only a part of the tendon to the tendon of the paralyzed muscle. This is the most logical, and when it can be used, the most satisfactory method, because the function of the transplanted muscle is not sacrificed. In contradistinction to the second method, this has been called by Vulpius the decending method, and by Hoffa the active method.

A fourth method, namely, the periosteal method proposed in 1896 by Drobnik, has been advocated by Lange. According to this method, the transplanted tendons are attached directly to the periosteum. The advantages claimed are twofold: first, that a more secure attachment of the tendons is obtained than is possible where a healthy tendon is sutured to one that is paralyzed, and second, the greater freedom allowed in the attachment of the transplanted tendons.

The method of suturing the tendons most generally employed is that advocated by Goldthwait, in which the paralyzed tendon is split and the transplanted tendon, having been scored along its edges to promote rapidity of union, is passed through the paralyzed tendon and fastened to it by quilted sutures. Catgut, kangaroo tendon and silk are used as suture material, but silk seems to be the most satisfactory.

In cases of partial paralysis, the contraction of certain of the non-paralyzed muscles necessitates either tenotomy or lengthening of the tendons before the foot can be brought into the normal position. Lengthening of the tendons is a more desirable procedure than tenotomy, because the continuity of the tendon is not destroyed.

Cases occur in which the existence of a deformity of the part has caused a marked lengthening of certain normal or nearly

R. V. H., Case No. III, Before Operation

R. V. H., Case No. III, Six Months After Operation

normal tendons. In such cases it is very desirable that the tendons should act in the most advantageous manner in the corrected position of the foot, and in order that they may do this it is often necessary to shorten certain of the elongated tendons. This may be accomplished either by excision of a portion and suture, or by division of the tendon and suture of the overlapped ends, or finally by folding the tendon upon itself without division of the continuity. In many cases, therefore, it will be very desirable to combine tendon transplantation with tendon lengthening or tendon shortening, or both. The tendons should be so transplanted and sutured as to hold the part in the corrected or slightly over-corrected position. The change of direction of the tendons should be gradual and not at right angles, and there should be no slack in order to insure against loss of power in contraction.

Lange has introduced an ingenious device in the treatment of paralysis of the quadriceps extensor tendon, which has produced very excellent results in three cases. Lange found that certain cases in which one attempted to suture transplanted tendons to the quadriceps extensor tendon resulted unfavorably, because of the softening and friability of the paralyzed tendon. To obviate this difficulty he employed a device recommended by Gluck and Kümmell for the treatment of traumatic defects of tendons. He severed the tendons of the biceps and semitendinosus from their attachments and sutured them together over the quadriceps extensor tendon. From the ends of these sutured tendons he passed a number of silk sutures subcutaneously over the patella and attached them to the periosteum of the tibia. Connective tissue developed around these sutures, and the results were excellent; all of the patients being able to extend the leg at the knee.

In a recent article, Lange presents the results of the use of what he calls "silk tendons" in fifty-six cases. He now uses the above-mentioned device in the transplantation of all tendons in which the tendons are too short to allow their attachment to the point desired. In certain cases he has simply passed several silk threads subcutaneously from a healthy tendon to the periosteum, where he wished to transfer a part of the muscular action, and has found that around these threads a tendinous structure develops which functions as well as a tendon, and in some instances is as thick as a lead pencil. Thus one is enabled to transfer a part of the action of a muscle without weakening its tendon. In certain cases the distance bridged over by the silk threads has been as much as twenty centimeters. In only two of the fifty-six cases did the silk threads fail to remain in

place, and none of the wounds suppurated. In one case Lange had an opportunity, during a subsequent operation, to remove a small portion of a "silk tendon" in the center of which the silk threads were present, and around this was a zone two-thirds of a millimeter in thickness which presented the histological structure of pure tendon. There was no demonstrable tendon sheath.

After all operations in which tendons have been transplanted the extremity should be put up in plaster in a normal or slightly over-corrected position. The extremity should be kept thus immobilized for from four to eight weeks to allow the tendons to become firmly united to their new attachments, after which massage, passive and active motion and electricity should be employed. As a rule it will not be necessary to use any specially constructed shoe or apparatus in the after treatment.

The results of the operation will in the great majority of cases be most gratifying. A weak muscle cannot be made to do normal work, but when it works advantageously it tends to grow stronger and more efficient. Furthermore, an hypertrophy of the transplanted muscle often occurs sufficient to enable it to do all the work required of it. It has also been observed that a muscle apparently completely paralyzed will regain part of its function by the transplantation of a healthy muscle. The result will by no means be a perfect one immediately after the removal of the plaster dressings, but it invariably improves, often in a most astonishing manner during the after treatment and active exercise of the part.

In a great majority of instances voluntary control of the new function of the transplanted muscles develops. The explanation of the physiological and neurological basis for the voluntary control of the function of a transplanted muscle is not especially difficult. Each voluntary muscle of the body is presumably controlled by a group of cortical cells which ordinarily act together. When part of a tendon is transplanted and the function of the muscle is divided, a division of activity of the cortical cells governing the muscle will gradually develop. When the transplanted tendon functions it produces a new sensation of which the individual is conscious, and gradually this sensation becomes definitely associated with the new function of the muscle, and voluntary motion becomes possible in just the same manner as voluntary function of the muscles develops in the new born child.

In cases where voluntary control of the transplanted muscles is not established, the transplanted tendons will tend to hold the foot in a normal position by their mechanical action, and the involuntary contractions will furnish the necessary stability.

The circulation and nutrition of the limb is invariably improved after the operation, and in some instances the growth of the bones of the paralyzed limb is accelerated, thus tending to overcome the deformity resulting from the impaired growth of bone which often follows paralysis of a limb.

In the following cases occurring in his service at the Child's Hospital, the writer has practised tendon transplantation in the treatment of deformities of the feet resulting from paralysis of the muscles.

Case No. III. R. V. H. Age eleven years. Referred by Dr. Robins, Northville, N. Y. Five years ago the patient suffered from an attack of anterior poliomyelitis which caused a partial paralysis of the muscles of the right leg. For almost four months after the attack the patient was unable to walk, but the leg gradually improved so that he was able to get around fairly satisfactorily, although he always limped badly and the leg was very weak. One year prior to admission to the Child's Hospital, the patient's foot began to be noticeably deformed in such a way that the patient walked on the toes and could not place the foot squarely on the floor. The deformity gradually increased until on admission to the hospital in November, 1900, there was an extreme equino-varus deformity of the right foot associated with which was some bony deformity, the anterior portion of the astragalus being abnormally prominent. The right foot was one and one-half centimetres shorter than the left, and the right tibia and fibula two and three-fourths centimetres shorter than the left. The muscles of the leg were flabby and atrophic, this condition being most marked in the muscles on the anterior aspect of the leg. There was very little active motion possible at the right ankle joint. The circulation of the leg was sluggish, and the condition of the skin indicated more or less trophic disturbance.

Examination showed an almost complete paralysis of the peroneal muscles, a partial paralysis of the extensor communis digitorum and of the tibialis anticus. The extensor longus hallucis was normal. There was a marked contraction of the tendo Achillis and a slight contraction of the plantar fascia. The circumference of the right thigh measured two and one-half centimetres less than that of the left, and the circumference of the right calf measured four centimetres less than that of the left.

The operation consisted in a preliminary subcutaneous tenotomy of the tendo Achillis, after which an incision was made over the tendon of the tibialis anticus and the tendon exposed for a distance of seven centimetres. Through the same incision it was possible to expose the tendon of the extensor longus hallucis for a similar distance. The tendons of both the tibialis anticus and the extensor longus hallucis were split longitudinally and the outer half of each tendon separated and transplanted subcutaneously to the outer side of the foot, where by means of an incision four centimetres long the periosteum over the base of the fifth metatarsal bone and the cuboid bone was exposed. The periosteum was dissected away from the bone and the transplanted tendons firmly sutured to it for a distance of one and one-half centimetres. The remaining portion of the tendon of the extensor longus hallucis was shortened by folding it upon itself. When

the operation was completed the foot was in practically a normal position. A plaster dressing was applied with the foot in an overcorrected position. At the end of ten days the first dressing was done and the foot kept in plaster for about twelve weeks, after which massage, electricity and active and passive motion were employed and the patient was gradually allowed to walk. To compensate the shortening of the right leg a high-soled shoe was placed upon the right foot.

The result six months after the operation was most gratifying. The patient regained all the normal motions of the foot, although pronation and supination were somewhat restricted. The position of the foot was practically normal. There was also some voluntary control of the transplanted tendons. The circulation and nutrition of the leg were greatly improved. One year after the operation, patient's mother writes that the foot has continued to improve during the past six months. The patient walks well; the motions of the foot are almost normal. The position of the foot is normal.

Case No. IV. H. V. S. Age four years. Referred by Dr Mosher. Patient had suffered since birth with congenital talipes equino-varus of both feet. Operations for the correction of the deformity had been twice performed upon the feet prior to admission to the Child's Hospital, early in 1901. When first seen the patient presented an extensive equino-varus deformity of the left foot, which could not be reduced manually. The right foot presented a less marked equino-varus deformity which could be readily corrected passively, but which could not be actively held in a normal position because of an extreme weakness of the peroneal muscles. There was no history of an anterior poliomyelitis and the muscular weakness appeared to be one associated, as not infrequently happens, with the congenital club foot. The extreme weakness of the peroneal muscles coupled with the antagonistic action of the tibialis anticus appeared to be in the main responsible for the existing deformity.

The operations on the right foot consisted in exposing the tendons of the tibialis anticus from the anterior aspect of the ankle to the inner side of the foot. The tendon was split longitudinally and the outer half transplanted to the outer side of the foot, where in a manner exactly similar to that described in Case No. III it was attached to the periosteum over the cuboid and the head of the fifth metatarsal bones. When the operation was completed the transplanted tendon held the foot in an almost normal position. A plaster dressing was applied with the foot in an overcorrected position. The first dressing was done at the end of ten days, when plaster was reapplied and the foot kept in plaster for about twelve weeks.

The result in this case was very satisfactory, the foot being held in practically a normal position, the equino-varus deformity entirely corrected and a moderate amount of pronation being possible.

In conclusion, it may be said that from a careful study of the literature upon the subject, as well as from personal experience, the writer feels justified in strongly advocating tendon transplantation as the most satisfactory method of treatment yet suggested for the management of many deformities due to muscular paralysis or weakness.

# XXXVII. GONORRHŒAL INFECTION OF THE PROSTATE

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Although within a comparatively recent date, investigation and studies by genito-urinary surgeons have been particularly drawn toward gonorrhœal infection of the prostate, yet, due to its very frequent occurrence, inflammation of this organ has for years attracted the attention of medical men. Zeller, as early as 1700, and Littré and Warren in 1711, were of the opinion that all gonorrhœa represented disease of this gland. Swediauer in 1728, and Girtanner in 1803, gave it as the cause of chronic clap, and the latter claimed that, in most every case, acute or chronic, it was more or less involved, and that from that time on, it constantly increased in volume and hardness, until the opening from the bladder was finally obstructed. These ideas were later reiterated from time to time by various writers until more recent studies have proven that prostatitis does occur as a complication of both acute and chronic gonorrhœal inflammation of the urethra, the result of a direct extension of the infection from its posterior part.

Anatomical studies show that the mucous membrane of the posterior urethra is in close connection with the prostate, and that it is but a short distance by way of the ducts to the glandular structure itself. Gonorrhœal inflammation of the posterior urethra, on account of these anatomical relations, unfortunately does not remain superficial or stationary, but the gonococci, advancing, penetrate rapidly into the prostatic glands, and sometimes into the parenchyma as shown by Bumm, von Crippa, Finger and others, and as the last says: "Exactly as they invade the glands of Littré and the lacunæ of Morgagni during the first days of an anterior urethritis, so in the posterior urethra they extend in all cases to the orifices in the prostatic urethra:" *i. e.*, the ejaculatory ducts, the prostatic utricle and the openings of the glands lining the mucous membrane: for although these latter are not as abundant in the posterior as in the anterior urethra, where they are invariably involved in chronic inflammations of that part, yet they are present, nevertheless, in large numbers, as shown by Albarran, who had demonstrated two principal groups: one at the visceal neck partly in the urethra and partly on the vesical trigone bordering on the neck, these

not being constant, and one about the middle of the prostate, at the veramontanum, opening into the urethra, or into the cavity of the prostatic utricle; and it is this latter group which, becoming infected, forms a focus for extension directly into the prostate. The former, when involved, would seem to be the cause, or partly the cause, of increased desire to micturate, and play a prominent part in the etiology of hypertrophy of the middle lobe. How far infection can take place through the vessels and lymphatics is, as yet, undetermined, though we know that a prostatitis can occur from a general infection (as in variola shown by Guion, parotiditis by Güterbock, and pneumonia by Beck) although rare, as also through the lymphatics (as in rectal and perirectal inflammations).

Statistics as regards the frequency of posterior urethritis vary according to different observers: from one-sixth of all the cases by Leprovost, to ninety-three per cent. by Dind. Finger states that in his experience it occurred more frequently in dispensary patients (eighty-two per cent.) than in private practice (sixty-three per cent.), but still less when patients were obliged to remain quiet in bed. Frank found it in about thirty-three per cent., and among 191 cases, dispensary and private, which I have observed within the past twelve months, it was present in seventy-six, or 39.7 per cent. This variance, as Finger mentions, is probably due to the different methods used in examination. The test known as the "Thompson two-glass test," where the patient is allowed to empty his bladder into two successive glasses, and where not only the first but the second should contain certain cloudy urine, if the posterior urethra be affected, is not, in a large number of cases sufficient, as a small amount of secretion may remain in the posterior urethra, and not being sufficient to flow backwards into the bladder does not contaminate the whole amount passed; but remaining, would be washed out with the first gush of urine, as well as that of the anterior urethra; not only this, but the first urine passed is sometimes not sufficient to completely wash out the anterior urethra, and part of its secretion may still be found in the second glass. Still I think that, in the majority of cases, if most of the urine be passed in the first glass and but the last few drams in the second, where the bladder is at least moderately full, and that if this last should contain filaments or be cloudy, it is sufficient proof of a posterior urethritis, and will answer all practical purposes. However, at times it may be thought necessary to resort to the "irrigation test," the washing out of the anterior urethra as thoroughly as possible before micturition, when, if threads or cloudiness are still present, the strong probability is that they

came from the posterior part; or, as advised by some, to use a colored solution for this anterior washing and to consider those threads not colored, as coming from the posterior urethra.

The question as to how soon the infection reaches the posterior urethra is an important one, and to prevent, if possible, this extension backward, is our first indication in the management of acute cases, by destruction of the gonococci at as early a date as possible, and there is reason, I think, to believe that this can be done in a number of cases.

The rapidity of extension would seem to depend upon, first the virulence of a given infection; *i. e.*, the strength and number of gonococci present; and secondly, upon the quality of the urethral mucous membrane and tissues as a medium of culture. Usually it has been thought to occur not before the end of the second week or the beginning of the third. Finger, Ghon, and Schlagenhaufer, were unable to find it present before the sixteenth day, in especially infected cases. Heisler, in 1891, claims that among fifty cases, *i. e.*, of posterior urethritis, he found it present in twenty per cent. during the first week after infection; thirty-four per cent. during the second; fourteen per cent. during the third; twenty per cent. during the fourth.

Frank reports ninety-six out of 210 cases as early as the sixth day, and Bierhoff twenty-one per cent. within the first week and thirty-eight per cent. within the first two weeks. Among my seventy-six cases, twenty occurred within the first week, *i. e.*, twenty-six per cent., and of these five were found on the fourth and one on the third day. The test accepted was cloudiness of the second urine, meaning the last few teaspoonsful, sometimes accompanied by frequent micturition, but more often not, phosphates and urates being excluded. Statistics as regards the occurrence of a posterior urethritis are apt, I think, to be somewhat misleading, as a number of cases will not only be found to have had previous gonorrhœas, but not a small percentage give a history of previous posterior trouble, as shown by frequent micturition, or epididymitis. Among my twenty cases occurring during the first week nine had previously had one or more claps, and of these one had had an epididymitis and one a so-called "inflammation of the neck of the bladder," while several had had increased desire to urinate, the present attacks evidently being a re-infection or stirring up of the old seat of trouble.

The case which occurred on the third day, *i. e.*, examined fifty-six hours after the first symptoms were noticed, was a first gonorrhœa with an incubation of two and a half days, the patient being intelligent and with no reason for disguising the facts.

He at the same time had pain and a beginning adenitis in the groin, and gonococci were found in his prostatic secretion, a prostate evidently the seat of a previous simple glandular catarrh, as shown by rectal examination.

Granting, however, that it develops or is present in at least one-third of all cases, how often may we expect prostatic infection to follow or accompany it? Sigmond, in 1858, thought that every case of clap of several weeks' duration was accompanied by a swollen prostate. Montagnon, in 1885, and Erard, in 1886, gave seventy per cent. as the number involved, and for Finger every posterior urethritis without exception is accompanied by a prostatitis; while Frank's recent statistics go toward confirming this opinion, where in 210 cases (of posterior urethritis) one hundred per cent. of the prostates were diseased, though not all with gonorrhœa, gonococci being found 179 times, other bacteria twenty times, and aseptic secretion with leucocytes in the remainder. More recently Bierhoff again strengthens this idea in his 151 cases, in fifty-one of which it was a primary attack, though his figures include a large number of Frank's cases. As in a fair percentage of my cases intracellular gonococci were not found (though all had either extracellular diplococci or other bacteria), I am not as yet prepared to state that every case of gonorrhœal infection of the posterior urethra extends to the prostate.

Although without doubt the infection can, and does, reach the gland in fresh uncomplicated cases, without active cause other than the direct extension of the gonococci, yet we know that, given an acute anterior urethritis, inflammation of the posterior part of the canal, and hence, prostatic infection, is aided by a variety of active agents, such as excesses in coitus and alcohol, repeated seminal emissions, the eating or drinking of irritants, excessive exercise and bodily exertion, as bicycle, horseback, straining, jumping, etc., local irritants, as the passage of a sound or catheter, or the too forcible injections of strong solutions. The class of cases, however, where no active cause can be assigned, but where the prostate in primary gonorrhœas becomes infected at an early date, is not a small one. Upon rectal examination, either one or several softened spots, or, perhaps, a general softening or doughy condition will very probably be found, indicating a pre-existing state of simple glandular and follicular catarrh.

If these softened spots in a non-gonorrhœal case are massaged, the fluid expressed will be found to contain, besides the constituents of prostatic fluid, more or less epithelia, and, as a rule, pus cells, demonstrating the presence of catarrhal foci. If there has

been an inflamed or congested condition of the posterior part of the canal, prior to infection, I think that the gonorrhœal process is very apt to extend to this part, and thence to the prostate. Likewise in the prostate itself, as we may consider that a gonorrhœal prostatitis always succeeds to a posterior urethritis, though often in a mild form, a pre-existing congestion of that organ favors extension of the process, and much more so the presence of catarrhal inflammation usually the result of excessive venery or masturbation.

*The pathological conditions* caused by gonorrhœal infection (best described by Ghon, Schlagenhaufer, Finger, Jadassohn and Albarran), consist in: first, the glandular catarrhal; second, the follicular, a variety of the catarrhal; third, the parenchymatous, simple or developing into abscess; fourth, the periprostatic phlegmon, and fifth, chronic prostatitis. The first three forms are more closely concerned in the limits of this paper. They are not, as a rule, sharply defined, the one from the other, but are more or less intimately associated, one following the other, as the parenchymatous from the follicular, and the latter a complication of the glandular. These follicles or "pseudo-abscesses" of Jadassohn, are either a sequence of a simple catarrh or an infection of a pre-existing folliculitis, a diverticulum or gland mouth having become obstructed with mucus, pus and epithelium, stagnation takes place within the gland, of secretion which contains gonococci, and which, increasing and being prevented from escaping if left to itself without mechanical assistance, sometimes ruptures, either, according to Finger, through the natural opening or near to it. This author reports a case of obliteration of the ejaculatory duct, caused by the cicatrix of one of these pseudo-abscesses. Sections made from the cadaver have shown gonococci, not only within the cavities but also in the surrounding tissue, showing a beginning parenchymatous inflammation, though this latter, according to Albarran, may occur primarily. When present, the parenchyma becomes infiltrated with leucocytes (Finger) and per rectum the gland is felt much enlarged, and may be, as shown by Velpeau and Sallemand, riddled with the pseudo-abscesses, thirty having been counted in one case post mortem.

The swelling may rapidly subside at the end of a week or ten days, or go on to abscess formation, point and empty in almost any direction; and, as we know, that into the urethra being the most frequent.

In the 114 cases given by Segond, there was recovery in seventy, death in thirty-four and urinary fistula in ten. "Some recoveries end apparently in complete resolution, others in an

induration which gradually leads to prostatic hypertrophy." (Finger.) Periprostatic phlegmon is in eight cases out of ten, consecutive to a prostatic lesion (Campenon), and, as a rule, non-separable from true prostatic abscess. It so generally involves the cellular tissues in the posterior and lower aspect of the organ that the term ordinarily implies inflammation of that particular part. Rectal examination is not satisfactory, a general swelling masking the true character of the trouble, which Albarran compares with peri-urethral septic inflammations, and in which he has demonstrated—at least in one case—the presence of an anaërobic bacillus, previously shown by Cottet and Duval, and then by Finger.

*Symptoms.* Gonorrhœal infection of the prostate may, in some cases, develop gradually or be present in spite of the absence of subjective symptoms, and in spite of the clearness of the second portion or urine (Frank). In the greater majority of cases, however, the signs and symptoms of a posterior urethritis are more or less marked, though often but slightly so, or so gradual in their onset, that they may at first escape observation, with but a slight turbidity of the second urine and accentuated though not pressing desire for micturition.

When well marked, when the second urine is decidedly cloudy and thready, with the desire for micturition frequent and urgent, with more or less strangury and possibly some blood with the last urine, symptoms referable to the prostate, a sensation of weight, pain and tension in the perinæum with sensitiveness and pain upon digital pressure per rectum, is also apt to be present, though the prostate may or may not be enlarged, depending upon the degree of previous trouble. Other cases of a more powerful infection may commence with a chill and fever, with shortly, perhaps, mechanical obstruction, a small stream twisted or in drops, or even, perhaps, complete retention. This is associated with intense pain in the deep perineal and anal regions, exaggerated by the slightest movement, or by defæcation or micurition. Rectal examination which is painful even without touching the gland, shows the prostate much increased in size, elastic and tender. The seminal vessicles are also usually involved, and may be likewise tender and swollen. This acute condition can last for a week or longer, depending much upon the treatment, and then resolve and form the initial stage of a chronic prostatitis, or go on to suppuration, prostatic or periprostatic.

*Diagnosis.* The lighter catarrhal as well as parenchymatous forms may, as said, escape observation, especially in the subacute and chronic varieties; a good rule, therefore, in all cases

where the disease has reached these stages, as also in every case of acute posterior urethritis, is first to make a rectal exploration, and secondly, an examination of the expressed fluid, as only in this way can we discover by the finding of pus cells and gonococci the true conditions; especially is this to be remembered in acute posterior urethritis. As a rule, the gland will be found more or less changed even in the lighter forms, as there are, I think, but few prostates which have not been the seat of a previous simple catarrh, and where areas of softening, or even a generally soft surface, will not be found. If parenchymatous, there is usually uniform enlargement, though sometimes only unilateral. Especial care is necessary in examining for gonococci, that we may be sure that those found in the masseéd fluid at the meatus are really from the prostate and not from the urethra; hence, before the examination is made, a thorough washing and irrigation of the meatus, anterior and posterior urethra, and bladder should be done, immediately after which the examination is made. Wiping out the posterior urethra with sterile cotton through an endoscopic tube, and collecting the expressed fluid as it exudes from the prostatic ducts, is probably a more accurate method, but in many cases not feasible, and I think scarcely necessary if we are careful to wash thoroughly.

In acute cases, the gonococci are not, as a rule, difficult to find, but in long-standing or chronic trouble they may be, and repeated search is sometimes necessary before we are successful, especially in finding them intracellular which is necessary for a diagnosis, unless Gram's decolorizing stain is used, and until we have after repeated search been unable to demonstrate their presence we are not, I think, justified in concluding that this part of the genito-urinary tract can be eliminated. The ordinary methylene-blue will in most instances be sufficient, but a better method, and one quite as simple, is that of first "fixing" the slide for ten-fifteenth seconds in methyl alcohol (to which has been added a few grams of alcoholic eosin, if a double stain is preferred), which fixes the preparation without shrinkage of the leucocytes as is the case when we "fix" by heat over the spirit lamp, and then either the ordinary methylene-blue or Goldhorn's polychrome methylene-blue may be used. The body of the pus cell is thus stained a pinkish hue, while the pus nuclei and gonococci are stained blue or purplish. In doubtful cases it will be necessary to resort to Gram's method of decolorizing. That gonococci may remain dormant in the prostate for years is shown by Frank's case, where five years after marriage a wife, without previous trouble, became infected, and where no urethral discharge could be found in the husband; but where after careful

massage of the prostate gonococci were found in the massage fluid.

When preparing a slide or cover glass for examination, it is important to remember not to express the fluid from the meatus or urethra, as by so doing gonococci which may be contained in the urethral glands or lacunæ might be dislodged. Sometimes, and not infrequently, the expressed fluid flows into the bladder instead of through the cut-off muscle; in this case, if the patient be allowed to pass the few drops of urine which have again collected, and this if necessary centrifuged, there will be no difficulty in securing sufficient for an examination.

After massage, the irrigation should be repeated to avoid possible further infection, or a re-infection of the urethra in chronic cases, where there is no longer any urethral discharge. The presence of many leucocytes in the expressed fluid is evidence of a prostatitis, and seminal vesiculitis, even where the bacteriological examination is negative (Frank); other bacteria which may be found, such as staphylococci or colon bacilli, are evidence of either a previous catarrhal trouble or of a so-called "secondary infection" in a sub-acute or chronic case, which condition may persist for years and may be the cause of sterility.

*Treatment.* As all modern treatment of urethritis, acute or chronic, anterior or posterior, together with their complications, depends upon the presence or absence of gonococci, all our efforts, primarily at least, are directed toward the extermination of this germ; therefore, the constant and daily control by microscopical examination must be regarded as a *sine qua non* if our cases are to be handled intelligently and successfully. I would apologize for an observation of this character, were it not a fact that but too few are prone to bear it in mind, and that but too many are satisfied with a once established diagnosis of an anterior inflammation alone; if even then there are not many who still deem it either unnecessary or avoid it, and, as has recently been remarked, "it would be equally as useless and futile to attempt to control the management and treatment of gonorrhœa without the microscope as it would a case of pulmonary tuberculosis."

A diagnosis once made, therefore, the quicker we can cure or heal an anterior inflammation the less the chances are for infection of the posterior urethra and the prostate; and if the extension backwards can be prevented only in a certain number of cases, we can thereby at least diminish the frequency of prostatitis. Those who still place their faith in the older methods of treatment, with internal medication by means of alkalies alone in the first stage, with or without hand injections of astrin-

gents, followed by the resins and hand injections in the later stages, are becoming fewer in number. Yet, on the other hand, it must be borne in mind that many of the so-called modern abortive methods of lavage have not, as a whole, resulted in the most brilliant successes, although they have certainly guided us in the right direction. Still, on account of non-success or failures, either from faulty technique, or from not seeing the patient sufficiently early, or from disagreeable experiences in the use of too strong solutions of the different remedies in vogue, or from complications overlooked which are impossible to cure without resorting to other measures, such as prostatic infection, from which as a focus from time to time upon slight provocation a fresh urethritis is set up; or, perhaps, because the older methods, being easier of application and less troublesome, many, we might say conservative practitioners, have either abandoned or have been loath to employ the so-called radical methods, still my experience has led me to believe that with the proper use of the modern gonococcidal remedies we will be enabled to diminish the percentage of inflammations of the posterior urethra and prostate, and the unfortunate consequences which are so apt to follow. The list of drugs which has been used as injections is almost as long as the pharmacopœia itself (at first vegetable substances, after which the metalic salts, the principal one of which, nitrate of silver, was used first in America by Johnston and Bartlett, and subsequently in Europe by Carmichael in 1818, and it was this drug which was first employed in an abortive sense, though in very strong solutions, however).

Bichloride of mercury, though in much prominence in recent years, was used as early as Hunter's time, in strengths of one to 1,600, but overlooked and only again brought forward since the discovery of the bacterial nature of the disease, by Cameron in 1884, Van der Poel in 1886 and Brewer in 1887, in weak solutions of one to 20,000 to one to 60,000, but used by the two latter experimenters in large quantities as irrigations, though into the anterior urethra only, as an "abortive" treatment.

More recently permanganate of potash has become very prominent, used in the same manner, at first by Reverdin in 1892, and then more thoroughly worked out and exploited by Janet in strengths of from 1 to 400 to 1 to 4,000. Janet, however, who irrigates directly into the bladder though not at the commencement of the disease, does not claim that the drug directly destroys the gonococci; but rather causes a serous infiltration of the mucous membrane, and in this manner acting unfavorably upon it as a culture medium, causes the gonococci to die off; subsequently, the newer silver salts, as argentamin, argonin,

largin, protargol and albargin, have come into use and have had their trial with varying success. The results which I have obtained have been with protargol, but recent experiments with albargin have also been encouraging, although not so much so as with the former, a silver protein, containing over eight per-cent. of silver. This is not, however, as stable a preparation as might be desired—at least that which has been put upon the market in this country, and it is, therefore, desirable that fresh solutions be frequently made, *i. e.*, every forty-eight hours, a practical way being to make up a few ounces of a ten per cent. solution at a time, best dissolved in a small amount of glycerine before the water is added.

Care and gentleness in treatment is at all times necessary and important, and traumatism from too forcible injections is especially to be avoided. It is quite unnecessary that the meatus be tinged with any blood after the treatment is finished. Instruments or catheters should never be introduced into the urethra as long as a purulent discharge is present. The procedure which I have found to give the best results is as follows: After the patient has been allowed to void his urine, nature's method of irrigation, the meatus is cleaned with a one-fourth to one-half per cent. solution of protargol, that being the strength used in the irrigations, and then, best in the horizontal position, the anterior urethra is filled with a one-half or three-fourths per cent. solution of cocaine, usually ten to fifteen grams being sufficient,—which is held from three to five minutes.

In sub-acute and chronic cases, the cocaine will not always be found necessary, but in acute trouble it is important to anæsthetize the mucous membrane on the face of the cut-off muscle as much as possible, to diminish the spasm of this muscle (which occurs when foreign bodies are introduced into the urethra), and thus avoid over-distention and traumatism. The protargol is then injected directly into the bladder, best by means of the large sterilizable urethral syringes holding about 150 grams, to which soft rubber or porcelain tips can be attached. This, I think, is preferable to the irrigating apparatus, as with it we can much better manage the force necessary, the amount of pressure being under direct control of the finger or thumb. The amount used varies, as sometimes patients will complain of a full bladder with 200 grams, which sign, however, is not a good one to be guided by, as this sensation may be absent until the bladder becomes over-distended; usually from 200 to 400 grams are employed where the patient is allowed to void it.

This procedure is repeated but once in twenty-four hours, with no intermediate hand injections by the patient himself.

Alkalies or salol are used internally when scalding is present, and the usual observations are made as regards rest, diet and keeping the alimentary canal free, as a concentrated urine is irritating. If our efforts are to be successful in, so to speak, aborting the disease, upon the second day the discharge will not only be less in quantity, but the microscope will show fewer leucocytes and fewer gonococci, and upon the third day but few gonococci, sometimes none, and fewer leucocytes, with an increase in epithelia and mucus, in a discharge which is distinctly mucoid in character, and decidedly lessened in amount. Upon the fourth day, seventy-two hours after treatment has been commenced, no gonococci should be present, and but few leucocytes, sometimes with no apparent discharge at the meatus when it is necessary to centrifuge the threads and flakes passed in the urine.

Although the discharge may now have stopped, it is still desirable to continue the irrigations for several days longer, for although much less virulent, there is apt to be a recurrence. If this recurrence is of a true gonorrhœal nature, or if the discharge has still continued, our efforts have not been successful, though the same treatment is continued until we have the so-called "aseptic" stage, with no bacteria, or the stage of "secondary infection" with other cocci and extraneous bacilli. In case of secondary infection, the irrigations are changed to bichloride of mercury from one to 30,000 to one to 15,000, likewise diminishing the strength as the discharge disappears, and this is to be remembered especially in the sub-acute and chronic types; but in these latter cases we will probably have to look deeper for the cause, namely in the prostate, though in saying this I do not mean to exclude the soft infiltrations of the urethral mucous membrane, with involvement of the glands and lacunæ, where endoscopy and dilatation with the Kollmann dilator come into play, but where the same rules for irrigation apply. Should no bacteria be found, and the secretion be "aseptic," astringents are indicated, used in the same manner as nitrate of silver, from one to 20,000 to one to 10,000, or, the so-called "Ultzmann solution" (one part each of carbolic acid, alum and zinc sulphate to 1,000 parts of water).

In order that an abortive treatment be successful, certain conditions, however, are necessary: First, the disease must be limited to the anterior urethra and, if possible, treatment should be instituted within the first twenty-four to forty-eight hours, as every hour after the onset lessens our chances of success; second, there should be no infection of the para-urethral glands, as these cannot be reached by the solutions.

This, we might say, prophylaxis, as regards infection of the

prostate, is not absolute and does not always stop the progress of the disease sufficiently early to make the abortive principle a success, perhaps on account of too quick and deep an invasion of too great virulence in non-resisting tissues; however, even though successful only in a certain number of cases, we are, I think, justified in making the attempt, and, not only this, but where the discharge has been absolutely stopped within the time limit, the symptoms should run a much milder and shorter course, dryness not being infrequent within the first week; and when this happens it is difficult to draw the line between such cases and those stopped at an earlier date, provided there is no posterior infection. Should at any time the second portion of urine become cloudy, should symptoms of prostatitis develop, or should this be present at the first examination, irrigations alone are not sufficient, as they do not reach the diseased gland, and other measures will be found necessary, *i. e.*, massage of the prostate.

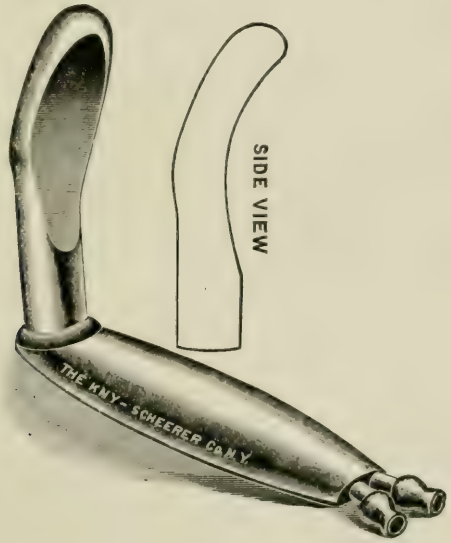
Instrumental massage is not to be recommended, as it is not only unnecessary but dangerous, and the work can be much better and more intelligently accomplished with the finger. Gentleness should be remembered in all cases, the amount of pressure employed varying; as a general rule, that in acute cases should always be lighter than when the trouble is chronic, and careless and unskilful work may quickly bring on other acute complications, such as an epididymitis. Nevertheless, it should be complete, however gentle, until the affected part or parts have been emptied of their contents, following which, the anterior and postrior urethra and bladder are to be thoroughly irrigated with protargol, in the same manner as when treating the urethra alone.

Fever and tendency to pus formation are contra-indications, and when present all handling of the parts, excepting with the irrigations, should be avoided until either resolution has taken place, or the abscess has ruptured or been opened. In very acute cases, where the parts are hypersensitive, daily massage is inadvisable, every second or third day, according to the sensibility of the patient, being sufficient; and where we have a generally enlarged and painful prostate, indicating parenchymatous inflammation, with or without the small pseudo-abscesses, conservatism is the best policy.

As all parts of the prostate cannot be reached by the finger, especially in the anterior part and middle lobe, the use of the Faradic current has been added and combined with the massage, by Hogge, Janet, Guiteras, Frank and Freudenberg, the latter's being an arrangement by which the Faradic current is passed through the finger of the operator as one pole, the hand at the

same time being insulated. If the mouths of the glands and ducts have become plugged with inflammatory products and constricted by surrounding inflammation, the results of treatment will be less rapid. Rest, though always to be borne in mind as advisable, and in very acute cases as absolutely necessary, can be disregarded in the mild forms, excepting to guard against undue exertion or exercise. As to the application of heat or cold in acutely inflammatory conditions, I prefer the latter either by rectal douche, or better by the rectal cooler or psychrophore, once or twice in twenty-four hours from ten to twenty minutes at a time.

Later, heat apparently acts better than cold, and in chronic cases, catarrhal or parenchymatous, especially those of a neurasthenic type, alternating heat and cold at the same sitting seems to act as the best stimulus to the circulation, combined with judicious massage. The instrument which I have recently employed for this purpose is a modification of that of Lewin, of Berlin (shown at the last Naturforscher Versammlung in Hamburg). It can be used with the patient in a sitting posture, and can be controlled by him, the entrance and exit of the water when in situ being in front of the perinæum and within easy reach.




As regards the chance of epididymitis arising, either in connection with the irrigations or with the massage, one certainly gains the impression that it is of much less frequent occurrence

than formerly, and even when it does occur during a course of treatment, it cannot, with any certainty or justice, be laid at the feet of the treatment itself. The frequency with which it occurs, when no special method is mentioned, varies from seven per cent. (Gebert, 1893) to 29.9 per cent. (Finger), though Finger's later statistics give 12.5 per cent. In 576 cases given by Le Fort, 264, or nearly one-half, had had no treatment whatever; and of the rest seventy-three had only had balsams and no injections.

Among Frank's 651 cases of gonorrhœa treated with protargol irrigations plus massage where prostatitis existed, but 2.5 per cent. were affected. Among the 185 cases which I have treated with protargol irrigations into the bladder, including those of recent date where massage was likewise used when necessary, it occurred in but four after treatment was begun (*i. e.*, 2.16 per cent); but in twenty-three out of twenty-seven cases, irrespective of any form of treatment, it was present before the cases were seen. One cannot say that irrigations roughly given, or that massage roughly performed, will not lead to trouble, but when carefully and intelligently carried out, I am strongly of the opinion that epididymitis will be of much less frequent occurrence than when no local treatment whatever is employed.

*The prognosis* of the lighter forms of gonorrhœal prostatitis is, as a rule, good; severe parenchymatous inflammation, however, may lead to such severe consequence that a guarded outlook is necessary.

The earlier a case is seen and treated the less chance for extension and for involvement of the parenchyma, and the less the chance for extension to the epididymis. True parenchymatous prostatitis is apt to be of long duration, and when there is abscess formation, as is well known, the point of rupture and involvement of neighboring tissues determines the danger of the case.

# XXXVIII. A BRIEF REVIEW OF SOME OF THE TUMORS OF THE PERIPHERY OF THE BODY, THEIR PATHOLOGICAL CHARACTERS AND TREATMENT

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My aim in the present undertaking is not so ambitious as the title implies, as this would in a large measure embrace the whole field of oncology. My purpose is rather to consider briefly some of the more dominant characters of a few new formations which originate in the integument or lie in close relation with it; some of the ordinary benign, or those of a malignant type. Their finer morphological or mixed characters will be passed over, nor will that controversial aspect of the subject, their causation, be entered on. Deep visceral and very rare growths will be passed over, nor will any attempt be made in the matter of classification.

*Regional Division.*—The head, neck, trunk and extremities.

*The Head.*—Scalp, various parts of the face, the lips, etc. New growths over the cranial walls, of any description, are comparatively rare, malignant tumors are almost never seen here; wens, sebaceous or serous cysts are, however, not very infrequent. But even these seldom occur except in those past middle life, as a rule; nor am I aware that they ever degenerate into malignant changes. One case of a large fungous fibrocystic tumor of the scalp has come under my care, in an aged, retired clergyman. It was destitute of a hairy covering and was so eroded on the surface that it bled freely on the least friction. On excision the parts healed kindly. Gummatous tumors of the scalp of those lodged in the diploëic spaces are not infrequent in specific disease. The scalp is a very highly vascular structure and prone to erysipelatous invasion, in wounds and operations on diabetic patients. Nævoid tumors of the scalp are not very infrequently seen in infants. This form of angioma tends toward spontaneous dispersion in nearly all cases. Although lipoma is almost invariably a subcutaneous growth, one rarely or never encounters it under any area of the scalp; possibly the general absence of fat in the connective tissue elements may explain this circumstance.

*Face.* Small, non-malignant growths involving the glandular elements of the cutaneous envelope of the face are quite common;

they are mostly congenital moles, papillomata, or sebaceous cysts. The latter, under the designation of chalasia, often engage the Meibomian glands in the subconjunctival tissues of the upper eyelids. These diminutive nodules scattered over various areas of the face, are obnoxious, rather as a cosmetic blemish, than for ever being a source of inconvenience except occasionally after middle life, when the papillomata may degenerate into malignancy. Angiomata of the various types may occupy any area of the face, and unlike those of the scalp, they tend with age to augment in area and never undergo spontaneous dispersion. Lipoma, teratoma and cystic neoplasmata are uncommon over these exposed parts, at least, in early life.

Malignant growths of the facial structures are clinically of three varieties: first, those seizing on integumental structures; secondly, those occupying the lower lip, and thirdly, those forcing their way through from the underlying osseous parts. In periosteal sarcoma of the facial structures a tumor may attain enormous dimensions without inducing gangrene or ulceration of the integument Labial epithelioma presents some remarkable peculiarities. I have never seen a case in which this type of epithelial hyperplasia involved the upper lip; it is quite invariably restricted to the male sex, as is œsophageal cancer. Its permanent destruction in its early stages is simple and certain in nearly all cases, without any description of cutting operation. The simultaneous turgescence or infiltration of the submaxillary glands present in many of the cases, arises rather from a transmitted irritation by any of the absorbent vessels, than by a consecutive epithelial dissemination, as is commonly thought, because when the local ulceration is once soundly healed this adenoid tumefaction promptly vanishes. Lupoid growths present many of the clinical aspects of malignancy.

*The Neck.* We may define the neck as that isthmus which connects the head with the trunk; bounded anteriorly by the upper border of the sternum and the lower border of the chin; laterally by the lower border of the inferior maxilla and upper border of the clavicle, posteriorly by the occipital protuberance above, and the first dorsal vertebra below. In no other region of the body will we find new growths so numerous and so various, except the female pelvis; congenital, inflammatory or neoplasmatic. Sarcoma is not very uncommon here, but primary cancerous growths very seldom bud forth from any of the epithelial elements of the neck.

The cervical tumors may be clinically and pathologically divided in a general way into three classes: first, the infective adenomata of infancy and childhood; secondly, the cystic for-

mations, branchial and other varieties of adult and middle life, and thirdly, the malignant or those of advancing years.

*Scrofulous Tumors.* These are tumefactions of early life, lodged in any of the cervical triangles, are superficial and deep. A large proportion of them spontaneously disperse, others go on to suppuration with more or less destruction of the lymph nodes, while in several, caseation or calcification occurs, with ultimate death of the infectious bacteria and resorption of the residue of suppuration. When these tumors are permitted to go on to suppuration they sometimes break through the integument with very disfiguring effects. Whether these processes ensue from infection, primarily through a mucous ulcer or through hæmatogenous contamination is yet uncertain. It is, however, altogether probable that the predisposing cause is a cachexia, inherited or acquired. In any event, they rarely, if ever, imperil life from a dissemination of their morbid elements by way of the circulation.

*Branchial, thyroid, retention or other cysts* usually appear after adult years are attained. The mucous cysts of a branchial origin, usually leading into the pharynx, or the colloid variety so common in the thyroid body, for some unknown reason occur with rare exceptions in the female sex. We may usually recognize the true character of the branchial cleft giving rise to a tumor by its tendency to periodically open and close; moreover, its discharges, besides corpuscles, contain pavement epithelia and mucous corpuscles. These cysts may open through any of the cervical areas as low down as the sternum. Branchial passages may originate from the pharyngeal vault, pursuing a most tortuous course, and open through the integument; they may be incomplete; *i. e.*, closed at the inner or at the outer orifice, or both openings may be closed and the secretions confined as in a retention cyst.

*Thyroid Cysts.* Serous or colloid cysts of the thyroid are generally unilateral. They vary in volume, commonly single, sometimes exercising so much pressure as to lead to the complete absorption of the lobe involved. They may displace the trachea and impede respiration, but seldom, if ever, lead to dangerous tracheal stenosis; nor does it appear from the literature of the subject that cystic disease of the thyroid ever so impairs the function of the gland as to lead to myxœdema, so commonly noted where there is parenchymatous degeneration. When these cysts attain considerable volume, very large arterial trunks penetrate their thick investing membrane. Several of these cases have come under my notice which underwent marked retrogressive changes. This is most noteworthy at the menopause.

They rarely took on purulent or inflammatory changes. Various types of cystic disease may occupy any of the antero-lateral areas of the neck. One of the most noteworthy is the remarkable form of congenital cyst which is lodged in the inner aspect of the sterno-mastoid, at its sternal head, and is an active factor in producing wry-neck in infancy. Fibrous, fibro-cystic and fatty tumors abound in these areas. I have encountered a peculiar type of rapidly recurring fibroid tumor, sometimes arising in the periosteum of the lower jaw or in close proximity to the parotid gland. In one instance, operated by me, the growth very rapidly recurred and attained the size of a large California orange. On section it was found to consist mainly of smooth muscle fibre, in a coarse, fibrous recticulum. It had a thick capsule without any very intimate adhesions. An experienced microscopist assured me that it had the common characters of a uterine myoma. It may be added that now, after an interval of five years, there has been no recurrence. The greater number of benign neoplasms of the neck take their origin from beneath the deep cervical fascia, under the thinnest part of the integument and over the course of the larger blood trunks.

*Malignant Growths.* Malignant formations, exclusive of lympho-sarcoma, are rarely encountered in any area of the neck, except as a consecutive invasion. Periosteal and fibro-sarcomata are not very infrequent in the submaxillary areas. These masses may obtain considerable volume and impede respiration or deglutition. Lympho-sarcoma is diffuse, always attended by a widespread infiltrate of round cells into every description of tissue contiguous with it. It begins in an isolated lymph ganglion and rapidly extends into the whole superficial and deep chain. The skin overlying these masses is tawny, thickened and so infiltrated as to constitute an essential part of the hyperplasia. The tumor is fixed, hard and indolent. Pain and distress only succeed from the pressure on nerve trunks and on the tubular structures passing through the neck. In all cases of this character coming under my observation the new growth was unilateral; in all but one the growth was anterior to the mastoid process; some of them involving the parotid or the sublingual gland; in one case, an aged French-Canadian lady from Troy, the growth was in the posterior cervical triangle freely involving the trapezius muscle and extending under the cerebellar fossa of the base of the skull; in another case of a man of sixty-five, an adeno-sarcoma in the anterior triangle, so widely infiltrated that in its incision the greater part of the sterno-mastoid muscle had to be taken away with the growth.

*Carbuncle.* New growths very rarely appear on the posterior aspect of the neck, but it is a favorite site for a very dangerous and destructive form of *furuncle*. This lesion, though infective and suppurative, should most certainly be included with neoplasms. It is true that it is essentially inflammatory; and so are lupoid and actinomycotic formations; some believe that cancerous are. Moreover, they may assume many of the physical characters of malignant action; they tend toward widespread diffusion and gangrene; they are accompanied with profound constitutional disturbances and excruciating pain. Like cancer, their local action is undoubtedly predisposed by a vice of the constitution; glycosuria usually co-exists. Carbuncle begins as a minute papule which, if not destroyed early, soon attains to large dimensions, its base and borders being of the hard, cartilaginous consistence of true scirrhus. Pus burrows largely under the very thick and dense integumental investment.

*The Thorax.* Lipoma, keloid and epithelioma appear with greater frequency over the thoracic surface areas than elsewhere. The special site of the tumefactions and new growths are the axilla and mammary glands in women. The lymph ganglia are very commonly tumefied without any definite cause, without any apparant focus of local infection, within the radius of the lymph vessels converging here. Sometimes they break down and suppurate, and again, undergo spontaneous resolution. In cases of phlegmon, felon or infected sore of the upper extremities, these nodes may undergo a large intumescence, to resolve and vanish with the subsidence of inflammation in the distant parts. Tumefaction of these nodes is quite invariable in all neoplasmata of the mammary gland, whether they be malignant or not. After the destruction or avulsion of the mammary tumor they again frequently subside to their normal contour. On the recurrence of the disease these glands again enlarge, assume a stony hardness and often break down. Just what rôle these ganglia in the axilla play in the progress of cancerous disease of the breast is by no means clear, although it was recently supposed that they acted as depots for diffusion and were early infiltrated by specific cancer cells, hence with the ablation of the mammary gland, the axilla and supra-clavicular spaces were cleared of these. Observations have, however, demonstrated that the procedure in no manner whatever influences the recurrence of malignancy or prolongs life.

M. Paul Raymond, Desnos and Condry (*Revue Des Maladies Cancereuses, Le Role des Ganglions Lymphatiques dans l'Infection Cancereuses*, November 20, 1901), all unite in

declaring the removal of tumefied absorbents in cancer as a needless and often harmful procedure. Raymond well observes, that the mere tumefaction of the gland by no means implies that it is the seat of cancerous infection: first, because cancer is certainly not an infectious disease; second, because these ganglia are a defence against the passage of lethal elements into the circulation; third, that since the teaching of Metchnikoff, it is well known that cancer cells, as well as others, secrete a toxic substance arrested by the lymph-glands. Hence, the rational inference is, that we should leave these nodular structures undisturbed. Remove the cause says this author—the site of active malignant action—and the intumescence will promptly disappear. Moreover, he adds, that a critical study of metastatic invasion will readily demonstrate, that the general channel of diffusion is the circulation. In the epitheliomatose melanotic, a type we regard as the most malignant and infections, we note no implication of the lymph-nodules; and, "perhaps," adds M. Raymond, "because of this loss of defence action of the absorbents, we observe the disastrous course of this form of the disease."

Dr. E. Desnos records an example of not only wide-spread tumefaction but suppuration and sloughing in the inguinal lymphatics, in a case of cancer of the verge of the penis, in a man of forty-seven, in which, after incision of the ulcerated verge, the disease action in the groin promptly cleared up. The author says, that the disease appeared six months previously in the form of vegetations; pain was atrocious with erections. Cautery aggravated the trouble. A vast adenopathy widely occupied both inguinal regions, extended into the thighs, the lower part of the abdomen and prepubian regions. Desnos says: "I did not touch the ganglia, as I knew it would be impossible to enucleate so wide-spread and deeply infiltrated a mass." After excision of the verge, the specimen was examined by M. Brault, who pronounced it epithelioma. The patient, who survived six years, had no relapse. In fact, adenopathic tumefaction conveys no more significance in a cancerous than a chancrous ulcer. Remove the source of irritation and toxirritation. The glands will subside of themselves.

*Mammary tumors* contribute a large share to operative surgery. The benign type of mammary tumor is varied and numerous, the most dominant being dermoid or fibro-serous cysts, or intumescence from deep-seated tubercular infiltration. The latter is commonly entirely without marked constitutional disturbance. I have seen both of these simple lesions operated, on the lines of malignancy, with the dreadful mutilation of

modern operations for malignant disease of the milk gland. Diagnosis is sometimes attended with difficulty here, but time and patient study of the case will generally dispel doubt. The symptoms may deceive the careless or inexperienced, and no one will abide by the microscopical examination of sections without the confirmation of the clinical history.

Malignant disease or fatal tumors of the breast are, unhappily, only too common, and it is hard to conceive of a more dreadful affliction. The subject is doomed, absolutely no hope remains of complete recovery from the disease, though fortunately, in a considerable number, a few years grace are permitted, or recrudescence may only light up after a very long period of latency, meanwhile an intermittent disease may carry the patient away. No single instance of permanent recovery has ever come under my notice in mammary cancer, however treated; the nearest to it was an old lady of seventy-six years, who had an atrophic scirrhus of the left breast of twenty-three years duration; it yet presented an open ulcer, discharging an odorless, serous fluid, but of the gland only a small nodule remained. In only one patient, a woman of thirty-six, who had borne six children, have I seen simultaneous scirrhus of both breasts; here the disease ran a very acute course, taking on the form of cancer *en cuirasse*.

*Keloid*, or so-called "spurious fibrous tumor," is sometimes seen over the superior areas of the thorax. It appears in welts or large, hard, raised ridges at times covering a large area. This curious lesion is most frequently noted in scars after wounds or burns, and is said to rapidly recur; but, one of the largest keloids I ever saw, lying over the right subclavian region of a young man, was entirely spontaneous, and after free excision never recurred.

*The Abdomen.* Growths which appear over any of the areas of the lower segment of the trunk are almost invariably of an intrinsic origin, *i. e.;* they spring from some intra-abdominal organ or structure; or perchance, are largely made up of the organ itself. External to, and independent of the aponeurosis, growths very rarely appear. Lipoma is the most common tumor found here though even this often presents a most delusive superficialty, as on dissection we will discover in very many that it is lodged deeply in the intermuscular planes, or even extends into the subperitoneal space.

*Cancerous growths* rarely appear over the abdominal surface. However, a year ago a case came under my care of colloid cancer in the integument just above and to the right of the umbilicus. It consisted of a hard node which had pro-

jected through the integument, presenting a granular, highly vascular surface, bleeding on the least friction. Surrounding it was a zone of purpuric papules, deeply discolored by a dark pigment. On excision the parts were divided wide of the growth, which infiltrated not only into the parietal peritoneum but also into the underlying omentum as well. The parts were united promptly, signs of generalization and metastatic invasion of the liver and stomach were in evidence. Three months after the operation she died.

*The Testes.* The testes and semen-strings are appendages of the abdomen. Neoplasms of the most diverse forms abound here. Several of them present the histological characters of those arising within the ovum and broad ligaments of the female. The most frequent and notable enlargements in the scrotum not of an acute inflammatory form are from serous formations and serous cysts. The former may occur as an effusion into the infundibular fascia of the cord or into the tunica vaginalis: the latter occur most commonly in early infancy and late in life. The cysts most numerous are the benign in the epidymis, in the hydatids of Garaldes, or the Wolffian bodies. They present many of the general characters of a hydrocele, but as their effective treatment differs widely from that called for in serous effusions, their correct diagnosis is of great importance.

One of the most common and serious enlargements of the testes arises in consequence of tubercular suppuration. After it breaks its way through the overlying investments and the ruptured fibrous envelope of the gland permits its pulpy parenchymatous substance to escape, a large, vascular fungating surface presents, very similar to the cauliflower excrescence of cancer. In the greatest number of this class the primary infection is in the epididymis. Cases of tubercular testis are very frequently purely local affections, though we will occasionally encounter them when the lungs are involved.

Dermoid Cysts of the Scrotum and Testes. Dermoid cysts of various types are found in the scrotum. They are said to most usually spring from the base of the spermatic cord where the epididymis joins the testis, in the vestigial relics of the Wolffian bodies. They may have very thick capsules, are indolent and open slowly: being composed of highly organized structure, they seldom take on purulent changes, though we have reason to believe that in early life very many of them undergo atrophic interstitial changes and disappear by resorption. A most remarkable case of a vast dermoid cyst springing from the epididymis came under my care four years ago, in a man of

sixty-three years. The mass weighed over four pounds and was accompanied by an inguinal hernia of the same side. The vast mass was supported and borne about by a leather sling suspended from the shoulders.

Varicocle, lipoma, bubo and abscess on the inguinal areas in the male may sometimes present so many and complex features in common with hernia that none but the most cautions and experienced can differentiate one from the other; again, any one of these tumefactions may coexist with hernia.

*The Female Abdomen.* When a woman speaks of having a "lump" over any of her ventral areas we almost instinctively suspect either a hernia or a tumor of pelvic origin; but there are masses presenting at her abdominal outlets which are neither. The most important and interesting are those which appear at the outer aperture of the canal of Nuck, those thick-walled serous cysts which are often trussed for years under the assumption that they are "ruptures." They appear most commonly in those who have never borne children, and are commonly on the right side. They are diminutive in volume, are very sensitive and more or less painful at menstruation. They may appear alone or may be complicated with an epiplocele. An early recognition of these cysts will lead to a permanent and effective cure.

*Vaginal Outlet.* Growths of the vaginal outlet are not numerous. Of the benign, one of the most frequent is a small, papillary, highly vascular tumor about the size of a small pea, situated in the vestibule at the margin of the meatus urinarius. This fleshy excrescence, or caruncle, may be the cause of great distress in urination and the signs of its presence, misinterpreted for vesical disease. Venereal condylomata sometimes sprout out in great cauliflower masses from the labium majus. In a young woman of twenty years I have seen one of these masses as large as the two fists. In the submucosa of the labia various cysts occur. A most remarkable example of a branchial cyst came under my care several years ago, appearing near the fourchette, its canal extending far up the inner wall of the vagina. Primary cancer may sometimes seize on any area of the vulvar outlet.

*Verge of the Anus.* At the anal outlet and the tissues contiguous thereto, but few growths appear, exclusive of hæmorrhoids and condylomata. Some few remarkable examples of branchial clefts appear there: in one of my own cases the enclosed Wolffian duct was large enough to admit the little finger, and extended up along the posterior wall of the rectum six inches, but had no communication with the intestine. It

freely secreted an opaline, glairy substance devoid of any fæcal admixture. These are known as sacro-coccygeal tubular, dermoid cysts, or post-anal gut. There can be but little doubt, but that no inconsiderable number of cases of so-called "fistula in ano" in vigorous young subjects belong to this class of pathological conditions.

*The Members.* Those appendages of the trunk, the upper and lower extremities, are rarely the site of any description of large, benign growths. The most notable examples of large neoplasms we encounter at the articulations or in the bone shafts are large gummatous nodes, or osteo-sarcoma in the cancellous tissue of the heads of the large bones. Osteo-chondroma most frequently seizes on the phalanges, sometimes attaining very large dimensions and occupying more than one finger simultaneously. They are invested by cartilage and lie deeply in the same substance.

*Bursæ Mucosæ.* Among the many benign formations seen on the surface areas of the limbs, those connected with the synovial structures are the most numerous. These are the housemaid's knee and the bursa-mucosa, so commonly seen along the course of the flexor and extensor tendons at the wrist. They may occur at the elbow or even the trochanter major. The distended, inflamed bursa over the patella may occur in the male as well as in the "housemaid." The etiology of these pouches is somewhat obscure, though they rarely appear except among working people. Those ganglia at the wrist or dorsum of the hand are seen with equal frequency in both sixes. They are usually freely movable and lie superficially in their surface aspect. They sometimes provoke troublesome neuralgic pains in the fingers with weakness and stiffness in the wrist or fingers. Many of these ganglia disappear spontaneously, others persist for years. Some of these are a rupture of the tendon sheath or spring from the carpal or wrist joint.

After about twenty-six years' experience in practice, private and public, I cannot recall ever having seen an example of primary cancer involving any of the tissues of the members. Gummatous tumors here are frequent in those suffering from specific disease, most commonly, however, in the lower extremity.

The heads of the larger bone shafts are at times the seat of diverse neoplasmatic or hyperplastic changes which greatly augment their volume and tumefy the overlying soft parts. To readily differentiate one condition from the other is often a task of great difficulty, but it must be accomplished in order to make way for rational therapeutics. These pathological conditions: first, tubercular infection, so frequently seen in chil-

dren; secondly, suppurative osteo-myelitis, consecutive to the infliction of trauma. This is seen to best advantage in the head of the tibia, not infrequently after so-called injury to the knee joint; thirdly, malignant disease. Under an erroneous impression as to the pathological processes in a case of this class, I have known a surgeon of experience condemn such a limb to amputation. He assumed that the case was one of osteo-sarcoma, the most destructive malady of the osseous system known. It is peculiarly a disease of early life, in the young child appearing in the distal head of the tibia. In former times this was designated "spina ventosa." Late in life, its favorite site is the femoral shaft. This type of neoplasm, when it seizes on the bones of the extremities, it quite inevitably mortal, though an early amputation will, in general, prolong life.

*Treatment.* A very great aid in the therapy of tumors is an intimate acquaintance with their natural history, the influences of heredity, the effects of local and constitutional conditions, and their pathological characters. Very many surface growths disappear of themselves, others remain throughout life unchanged; some vanish after acute local changes involving the parts where they are lodged; others again, after varying periods of quiescence, undergo malignant changes or great augmentation in volume. Professional aid is never sought for in this class of cases, unless the excrescence constitutes a blemish in exposed parts, unless it becomes a source of discomfort, or apprehension is excited by a notable increase in volume.

Treatment is constitutional or local, or both combined in various types of the non-malignant. In others the resources of surgery are invoked. The aim in view, is to destroy the tumor by the safest and simplest means. In the hands of an experienced operator, with all the modern accessories of surgery, immediate excision is the ideal treatment for those growths which resist constitutional measures. But there are many who have an instinctive dread of any sanguineous procedure, however trivial. The prejudices of the individual must be respected; besides we should never overlook the possible danger attendant on anæsthesia.

With those refusing excision by the scalpel, we may often resort with signal advantage to sclerogenesis or parenchymatous injections, which will provoke suppuration; or, on the other hand, promote absorption. Many small, papillomatous, cystic or vascular growths may be easily destroyed by corrosive acids or the thermo-cautery. Electrolysis or the alternating faradic current serves an admirable purpose in a large group of cases. In operations on exposed parts, as the face or neck, it is highly

important, especially in the female, to leave the smallest possible scar. When the growths are diminutive and lie near the surface local anæsthetics, eucaine, cocaine or chloride of ether spray will quite entirely supersede pulmonary anæsthesia.

In labial epithelioma, my preference in nearly all cases is for the escharotics, the acid nitrate of mercury being the most satisfactory. It may be repeatedly applied with a glass rod. It acts with special energy in the neoplastic elements and is followed by a scabbing over of the ulcer. This mode of treatment is more or less painful and may be tedious, but in my hands, for lip-cancer it has never failed. Excision is a much simpler and more prompt mode of treatment, but it always involves the removal of more or less healthy tissue, leaving a deformity and a tightly-drawn lip. I am confident that if the profession would more frequently avail itself of the chemical caustics in cutaneous neoplasia, we would greatly narrow the field of cancer quacks, and induce many to submit to treatment who will otherwise refuse any cutting operation.

From the neck we come to the thorax, to parts concealed by garments, and where we are less influenced by cosmetic effects than durable results. For this very reason, that parts are covered, we are seldom called upon to remove growths unless they are a source of suffering or have reached a large volume. The first and fundamental step in the operative technique in the excision of tumors in covered parts is *a large incision* through the skin and fascia. Effective hæmostasis is second; the remainder of the procedure is a matter of detail.

In operations on the breast, we must have a care that we do not mutilate our patient, and do not forget that this gland is an integral part of the generative system. Hence, not hasten to cleave it from the body until we are assured beyond all possible doubt, that it is the seat of malignant disease: for a large proportion of new growths in the breast or on its periphery are benign, which should be enucleated without sacrifice of the gland. In the observance of the new propaganda of "cutting early and cutting wide," in tumor excision, there is great danger when we essay to operate on neoplasia of dubious origin, as very many are benign in their early onset. In malignant growths of the mammæ, I have not yet been able to convince myself of the warrant or justification of those enormous sacrifices of tissues and structures made necessary by a theory which is wanting in the foundation, of anything more than unsupported speculation, particularly, when I note recurrence equally early in these as in those in which the chest wall is spared. The displaced shoulder, the neuralgic, heavy, bloated, nearly useless arm succeeding

these wide dissections present a gruesome spectacle in all, but the more melancholy in the wage-earner or the mother of a family.

Tumors of the abdomen are treated on the same general lines as those of the upper trunk. But, in groin or scrotal cases rational therapy rests almost wholly on the differential diagnosis between hydrocele of the infundibular fascia or the tunica vaginalis, cystic disease or hernia.

I have found cysts of the scrotum to occur very much more frequently than is generally thought. Very often they are tapped under the assumption that they are hydroceles; several of such cases have come under my care in which the cysts were enucleated entirely free from the tunica vaginalis. In the enucleation of these cysts we will frequently discover various elements of the cord, so intimately blended with the thick capsule that a very delicate dissection is necessary in order to safely isolate them.

Tumors involving the members are dealt with on general principles. Here one may simply induce artificial ischæmia and operate in a bloodless field; moreover, we may largely dispense with pulmonary anæsthetics. If we begin with a safe groundwork of accurate diagnosis, and observe to the utmost the principles of modern osteoplastic methods, in dealing with diseased bone elements, the best possible results will be obtained.

The correct management of thecal ganglia, or bursa mucosa, calls for more than passing notice. The opening of a synovial membrane by accident or art is never a trivial matter, and all these bursæ open either directly into a tendon sheath or into the capsule of a joint. Hence, why we should endeavor in all these ganglia, at or near the wrist, to rupture them by concussion force rather than attempt to dissect them out. When their investing capsule is thin a moderate blow will rupture them, and there is little more to do; but sometimes their capsule is very thick and resistant, and these simple means will not avail. We should treat them by free incision. Enucleation of them is difficult and is usually followed by widespread inflammation, sometimes of a grave character. Aspiration or injection is neither safe nor satisfactory. In my experience in this class nothing answers so well as a free incision and evacuation of the contents. After evacuation under rigid asepsis, a simple moist dressing is applied, the wrist, fixed in a splint and kept severely quiet until repair is well advanced. In housemaid's knee, on the contrary, complete excision with simple dressings and rest to the joint offers the best possible mode of treatment.

Removal of tumors of the neck is always a procedure not to

be lightly undertaken. Their surface characters, their apparent superficial location and their free mobility are most delusive features to the inexperienced. Quite invariably they maintain close connections with the large, deep blood trunks, with highly important nerves and other structures. In all these cases it is well to make a free incision through the integument and deep fascia that vital parts be laid bare under the naked eye. The formidable danger here is large hæmorrhage, something which can never occur in experienced hands, and under proper provisions.

In this situation, as elsewhere, there are at times inoperable tumors; "when fools rush in where angels fear to tread;" wherein the conscientious and experienced decline to participate in a tragedy, or rob the afflicted of her few remaining days. Operating in this sad class brings more discredit and contempt on legitimate surgery than are compensated for by its many triumphs.

Carbuncle, always a painful lesion and sometimes dangerous to life, may be nipped in the bud, so to speak, or arrested early by a simple and never failing remedy, displacing altogether deep bisection or the more formidable procedure of excision. The hypodermic employment of pure carbolic acid here is a specific. In the papillary stage the deep injection of one or two drops of carbolic acid will at once abort any further advances, but even though the purulent stage is reached multipuncture and injection will instantly annul the excruciating pain and arrest further spread of the infection. Its action is escharotic, coagulating the albuminous elements of suppuration and inhibiting any further microbic action. After its employment in advanced cases, we employ emollients until the necrotic tissue is thrown off and the ulcer has healed.

# XXXIX. THE PATHOLOGY OF THE TISSUE CHANGES CAUSED BY THE ROENTGEN RAYS, WITH ESPECIAL REFERENCE TO THE TREATMENT OF MALIGNANT GROWTHS

By CARL BECK, M. D.
NEW YORK CITY

While the treatment of malignant growths by the Roentgen rays has not yet gone beyond the experimental stage, it established a series of new and most important facts, which are well worth attracting the attention of the medical profession. It was obvious, that the integumental changes which manifested themselves after prolonged exposures to the Roentgen rays, generally called "X-rays burns," suggested their therapeutic utilization.

In considering the pathology of these changes conclusions can be drawn for the therapeutic modus operandi. Some time ago (see *Medical Record*, January 18, 1902) I suggested to distinguish three different degrees just as in ordinary burns, the first degree being characterized by the symptoms of hyperæmia, the cutis being infiltrated and its temperature being somewhat higher. Exfoliation takes place in small scales. The most pronounced subjective symptom is a tormenting itch in the skin. Effluvium capillorum, which manifests itself, as a rule, without showing any visible signs in the integument, belongs to the same category. It seems that there is a regressive metamorphosis (atrophy) of the differentiated elements of the skin, viz., the glands, hairs and nails. The main feature of the second degree consists in the formation of blisters, the clear or yellowish contents of which lift the corneal from the mucous stratum of the rete Malpighi. The inflammatory signs are well pronounced, the tension considerable, and the pain intense accordingly. After the removal of the blisters the corium is exposed as a red and sore surface. (Bullous form of Roentgen-ray dermatitis.) The third and gravest degree is characterized by the escharotic destruction of the irradiated tissues. They show the signs of dry gangrene, and their appearance is brownish-black. If they exfoliate by a slow suppurating process, or if they are removed, as they should be, by surgical interference, a granulating ulcer remains, the cicatrization of which may take months. (Necrotic form of Roentgen-ray dermatitis.)

The most characteristic difference between ordinary burns and the integumental changes produced by the Roentgen light is the fact that the latter do not manifest themselves before the lapse of a period of incubation, as a rule, after about two weeks. This stage, which we may properly call the latent, lasts about ten days in the simple type of Roentgen-ray dermatosis. Then the integument becomes hyperæmic. At first there is a light, later dark, redness, and finally the skin becomes brown and scaled. After a few weeks there is complete recovery. Sometimes slight pigmentation of the integument remains.

In the bullous type of the Roentgen-ray dermatitis, after an incubation of about two weeks, intense reaction takes place. This is a subjective as well as an objective character, and lasts about as long as the period of incubation. Then cicatrization takes place. If the area of irradiation was covered with hairs, depilation occurs. The process of regeneration of the hair is slow. Pigmentation and telangiectasis nearly always remain. The necrotic type of the Roentgen-ray dermatitis, as a rule, develops itself a few days later then the bullous form, and requires months for its cure.

The terra-cotta-like hands of skiagraphists demonstrate the chronic type of Roentgen-ray dermatosis. Their integument is wrinkled, shrivelled, vulnerable and partially cracked, the nails horny and also cracked, and the phalanges so much thickened that there is tension while motion is exercised. The elasticity is lessened and the sensibility increased. Effluvium capillorum is an invariable companion. Undoubtedly there is a cumulative influence.

Examination of the integumental changes in men, as well as in lower animals, shows a disturbance of nutrition in the walls of the blood-vessels, just as in ordinary burns, the main difference consisting in the slower development of the process. The peculiar thermic influence of the Roentgen light on the tissues is so exerted that the nutrition of the cells is impaired. It is only when this impairment has reached a greater degree that the signs described above manifest themselves. And these signs are again influenced by the power and amount of the Roentgen light. A greater or lesser susceptibility need also be admitted.

The fact that in some individuals dermatitis surpervened after a few exposures, while others remained free for years, suggests the existence of such an idiosyncrasy. I, for instance, was in spite of the freest manipulation of my armamentarium not affected by the rays for five years, so that I was inclined to imagine at last that I was blessed with a certain immunity. But when one day I was handling powerful tubes in connection with high electric

Fig. 1

Fig. 2

Fig. 3

Fig. 4

powers, I noticed an intense burning sensation at the dorsum of the right hand, the surface of which I used to turn toward the Roentgen tube while the strength of the light was tested through my own wrist. The burning sensation was accompanied by a most distressing tension, which was intensified by every motion. At first the hand appeared erythematous. Later on it became terra-cotta-like, and then the epidermis exfoliated in small scales, so that it resembled leather. Perspiration ceased entirely. During the sultry days, which came in such an unwelcome number last summer, the distress was especially great: this I would explain from the stimulation which rendered the hardened follicles functionless. I then substituted the left hand for the fluoroscopic control, and protected the right one with a tinfoil glove. The violent symptoms disappeared. Soon, however, the same signs developed at the dorsum of the left hand in a somewhat milder degree, so that I was finally condemned to compiete abstention from the Roentgen rays. Since restricting myself to the most necessary manipulations only, and observing a fair distance from the light as long as fluoroscopic control can be dispensed with, no disturbances have been felt by me, and the appearance of my hand is again perfectly normal, until shortly ago when I, after extensive exposure, had a slight new attack from which I am still suffering.

The same idiosyncrasy exists among animals. To my previous report (*Medical Record*) in my experiments on lower animals I may add that one of the mice, with which I am experimenting at present, is still alive after being irradiated forty-two hours now on an average of two hours a day in succession. Depilation started after thirty-eight hours of moderate irradiation, and is still of a very slight nature.

We may assume that, if in chronic inflammatory processes constriction of the vessels takes place, the papillæ starve. A hair extracted after prolonged irradiation loses its structure. It ends in a point instead of showing a root. Integumental specimens show thickening of the tunica intima of the small blood-vessels, a process which tends to narrowing their caliber. Fibrous tissue in reticular arrangement is deposited. The tunicæ muscularis and adventitia are affected in the same manner. The influence of the rays on integumental disease is similar. In regard to hypertrichosis, favus, eczema, psoriasis, rosacea, acne vulgaris, prurigo, etc., I refer to my previous publication (Text-Book on Fractures, with an Appendix on the Practical Use of the Roentgen Rays, Philadelphia and London, 1900). The tissue change taking place in neoplasm is also of the nature of a chronic inflammation. The nutrition of their superficial strata is disturbed, the cells

starve and, if over-irradiation is continued, necrosis may be the result. Thus we understand the curative influence on lupus, carcinoma and sarcoma, especially if these neoplasms are confined to the integument.

Successful treatment of lupus is reported by many. To the cases published by me previously I may add one of facial lupus erythematodes in a woman of twenty-five years (Fig. 1), was irradiated fifteen times until reaction occurred. It was not until the twenty-fifth exposure that the redness decreased (Fig. 2) and some of the nodules began to shrink. After the twenty-fifth exposure the ulcerations had cicatrized (Fig. 3), the scabs disappeared and no nodules were found. The redness still persisted for six weeks. It was treated with unguentum zincosalicylicum. The cure is perfect (Fig. 4). The patient has a history of tuberculosis. A brother as well as a sister died from pulmonary tuberculosis. She had three children, of which one was still-born and another one died from meningitis (tubercular?). The third is healthy.

The curing influence of the Roentgen rays on carcinomatous tissue can also be no longer doubted. Pusey, Williams, Weigel and others besides myself have reported cures in epithelioma. All integumental forms of carcinoma are accessible to Roentgentherapy, also the tongue and the cervix uteri at an early stage. In spite of this fact I would regard it extremely unwise to leave to the rays what can be done much quicker and more effective with the scalpel, namely extensive removal.

But irradiation should be considered in the after-treatment as well as in inoperable cases. Even after a thorough operation, carcinoma cells are usually left in the deeper strata which cannot be reached by the surgical knife. It seems that the rays have an influence on them. If these cells could really be destroyed, as future experiments have to prove, a great advance in the treatment of this horrible disease will have been made. I so far treated four cases of recurrent carcinoma mammæ after the operation. In all of them decided improvement could be observed. In a case of adenocarcinoma, recurring three months after most extensive removal by an excellent surgeon, a large infiltrated mass, reaching from the sternum to the axilla, had formed within another three months. The supraclavicular region, the shoulder and the whole upper extremity of that side were edematous to the utmost. Near the sternum was a small ulcerating area. The patient suffered temporary pain of great intensity. I did not believe then that there was a possible chance even of improvement, but the husband urged me to try irradiation nevertheless. The whole area was exposed then, first in

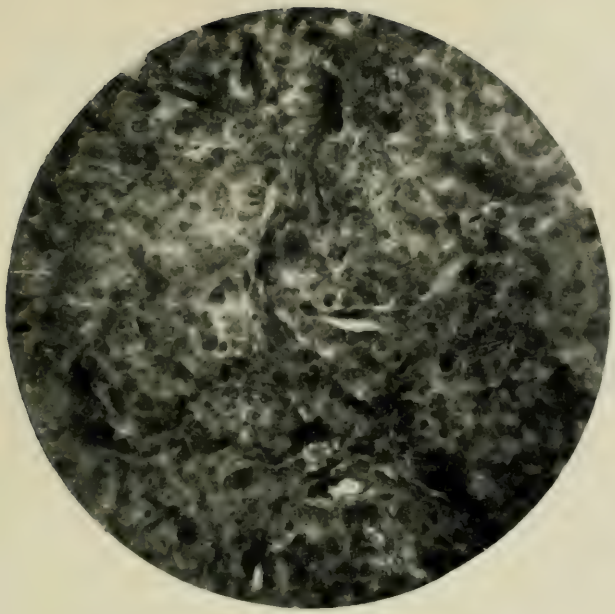

Fig. 5

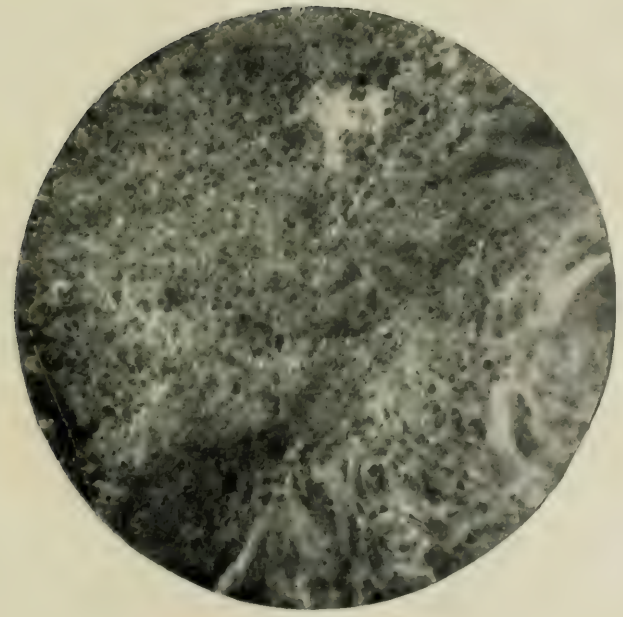

Fig. 6

intervals and then every day, at an average of twenty minutes. There were sixteen exposures altogether until now. After the fourteenth exposure the infiltrated area began to shrink and the edema disappeared entirely. The recurring growth had reached the pleura as is evident from the presence of a pleuritic effusion which was aspirated. A specimen taken from the irradiated area shows colloid degeneration, the adenoid character having disappeared. This seems to some extent to show the mode of cell metamorphosis which the cells undergo after irradiation. The microscopical examination made by Dr. H. Kreuder, at St. Mark's Hospital, revealed the following condition: adenocarcinoma with beginning colloid degeneration. The tumor shows a resemblence to glandular structure, in most parts the alveoli are completely filled with epithelial cells, so that in some places they appear like alveolar carcinoma (Fig. 5). Some areas have undergone degeneration, their epithelial cells in size and the degenerated area—except the nuclei—appear coarsely granular. (Fig. 6.) Changes of the same nature are observed in the epithelium of the skin covering the tumor (also due to the action of the rays). In some parts of the necrotic area a large amount of dense connective tissue and marked vascularity is noted, the leucocytes diminishing at the same time. The patient is at the present time free from pain, and her appetite has increased. A few days ago the superficial layers around the ulcerating area shed themselves as scabs. While the final outcome will hardly be averted, the most powerful influence of the rays in this desperate case appeared to me to be marked.

In such cases hard tubes must be chosen, while in neoplasms confined to the skin soft tubes are preferable. My observation suggests to me that irradiation should be begun as soon as union is perfect after the removal of neoplasms, and should be kept up for a period of several weeks.

As to the technic of Roentgen-therapy, it is advisable to expose five minutes first, and after a week for about ten minutes. If, after a third exposure (two weeks after the first exposure) then no reaction followed, the patient apparently shows no idiosyncrasy. Then he may be irradiated every second or third day, at last daily unless intense reaction shows. During the tentatory exposures the distance of the tube should be four inches, later on it may be one inch only. Some patients like the direct contact with the tube, and I have seen no harm from it in resistent individuals. A shield of lead must be fastened around the area to be irradiated in non-malignant disease, and especially if the face is concerned. It may be attached by a bandage. To the uneven surface of the margin tinfoil or a piece

of cork may be added. Corresponding with the area to be irradiated a hole is cut in the shield. In the treatment of neoplasms, however, the use of a shield is improper since it is intended to have the influence of the rays extend as far as possible. During the intervals xeroform-salve (one to ten lanolin) should be employed.

As first shown by me (*Munich Medical Weekly*, May 6, 1901—also see *New York Medical Journal*, November 16, 1901), the effect of the rays is also well marked in integumental sarcoma. In a case of melanosarcoma a decided local cure was affected, although the patient died later on from metastasis. There is no doubt that the course proved the efficiency of the rays on the integument, and if the patient would have been subjected to earlier treatment by me a local cure would probably have been effected before metastasis would have taken place. Microscopical examination of the growth showed well-developed large sarcoma cells. The pigment was chiefly seen in the form of streaks, but by higher magnification would be recognized as fine granules which are contained in cells in the connective-tissue framework of the tumor. In some places they resemble netting. Few cells in the alveoli of the sarcoma cells were pigmented. But some portions of the section, especially the necrotic areas, showed a great amount of pigment. One of the specimens was colored with hæmatoxylin, and eosin, the second with Van Gieson's fluid.

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## XL. AN UNIQUE CASE OF DOUBLE ACUTE DACRYO-ADENITIS

By D. H. WIESNER, M. D.
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Dacryo (lacrymal) adenitis is an inflammation of the lacrymal gland. The rarity of this disease, and the unusual and pronounced picture and symptoms presented by the case to be now reported are the reasons for offering this paper to the State Medical Society.

A word of anatomy: the lacrymal glands, two in number, are situated at the upper and outer part of each orbit a little behind its anterior margin—they are lodged in a depression of the orbital plate of the frontal bone to which they adhere by fibrous bands; by reason of this situation they are little liable to injury and so are not subject to traumatic inflammation. Each gland consists

of a larger and superior portion and a smaller and inferior; similar to the salivary, the lacrymal glands are acinous in structure; in the centre of each acinus the duct begins; together these ducts empty onto the conjunctiva at or near the fornix. The lacrymal secretion (tears) is a faintly alkaline fluid, whose exit from the conjunctival sac is effected by the act of winking; the purpose of the secretion is to keep the conjunctivæ and corneæ continually moist and bathed, so essential to the usefulness of both these most important parts of the eye.

Dacryo-adenitis may be acute or chronic; the chronic variety is not so very rare, and is due to the extension of inflammation from some neighboring organ or tissue; is often the result of a chronic dacryo-cystitis; the acute variety is very rare; uncommon in one gland, more so in both; from the structural resemblance of the lacrymal gland to the parotid, dacryo-adenitis has been called mumps of the lacrymal; also it has been noticed that in epidemics of parotitis, cases of dacryo-adenitis have been observed; be this as it may, the parallelism of the two glands in structure and function has probably been the reason for applying the term "mumps" to inflammation of the lacrymal gland. One writer mentions and describes the disease, but confesses he never saw a case; another attributes its rarity to lack of care given to observance of the disease.

The history of the following case is presented because of its rare occurrence and because of its striking characteristics:

M. P. Aet. 23. Seamstress; came to the Manhattan Eye and Ear Hospital, of New York City, November 15, 1901; four days before admission she noticed right upper eyelid became red, swollen and painful; shortly, in a few hours, to be followed by a similar condition of the left; at the same time there was a free watering (lacrymation) from both eyes; of the treatment during this time there is no record.

On her appearance at the clinic, at first glance it was thought it was a case of purulent conjunctivitis—gonorrhœal; on closer inspection, however, the following was noticed: both lids of both eyes, most markedly the upper, were swelled, red and tense; the palpebral fissures were decidedly narrowed, showing only a portion of the corneæ; the corneæ were both clear, not the seat of any disease; pupils responded normally to light and accommodation. On separating the lids a striking condition presented; swelling, redness and œdema of the conjunctiva—chemosis; this chemosis was extreme at the temporal side of both eyes, tapering off so that at and near the inner canthi, while there was the intense injection of the conjunctiva, there was little or no chemosis; both eyes were forced toward the inner canthus by the chemosis. Convergent squint. There was a free watery discharge (tears) from both eyes, but no pus; from one eye was obtained a string of muco-pus, which, on examination by the hospital bacteriologist, was found to contain neither gonococci nor the bacillus of

acute catarrhal conjunctivitis. On palpation, a tumor was felt at each outer canthus, irregularly outlined and could be traced into orbit a short distance; the swelled lids and conjunctivæ made a closer examination of the inflamed lacrymal glands impossible. Pain was a prominent symptom; this was constant and of a dull aching nature. This could be inferred, not only from her statements, but from her countenance; her face had an anxious, distressed, apprehensive appearance; her fear was that the severity of the disease might threaten her sight. Vision O. D. $\frac{20}{30}$ O. S. $\frac{20}{40}$; no fundus lesion by the ophthalmoscope.

The striking characteristics of the case were the chemosis, so strongly marked at the outer canthi, the inner being in a contrasting degree free; the puffed tumified lids, the copious lacrymation, the convergence of both eyes and the dull aching pain. The patient was taken into the hospital and put to bed. Boric acid cleansing ordered as required and ice cloths continuously, that is day and night. Examination in the ward did not at any time reveal the least signs of parotitis; nor had the patient been exposed, so far as she knew, to this disease.

On the second day it was noticed that the swelling had begun to subside; corneæ clear, nor were they affected during the course of the disease; no atropine used. Cleansing p. r. n., and iced cloths slowed up some; not so regularly applied during the night; the free lacrymation continues, no pus, still some convergence; pain less severe. Four days after admission the chemosis had almost subsided; other symptoms less; her face now assumes a more cheerful aspect; the apprehensiveness is leaving her in great part. The further progress toward recovery was without break, patient being discharged, cured of her dacryo-adenitis on the eighth day; some convergence still persisting.

It was observed, that with the subsidence of the chemosis there was also a lessening in size of the tumorous lacrymal gland; when patient left the hospital this had about disappeared.

The interesting and striking points in this case were the picture presented, the activity of the disease, the treatment and the complete recovery. All these have been gone into sufficiently, perhaps; a word on the treatment pursued may be admissable: Most writers consulted agreed that hot fomentations were indicated, some recommended free incision: the latter, of course, if the gland abscessed. In my case ice cloths were used continuously and recovery resulted without a breaking down and abscessing of the glands.

The literature (medical) on this subject is meagre. Roosa, in his book says, "Double bi-lateral dacryo-adenitis is a gland disease of very rare occurrence. The mono-lateral variety not so rare." Noyes — Ophthalmology — mentions "seeing only one case where both glands were the seat of inflammation: treatment, *hot* applications and incision." Swanzy—"Acute dacryo-adenitis extremely rare—reports one case of purulent dacryo-adenitis." Noyes and Oliver—"Except as part of a general

inflammation of the orbit acute dacryo-adenitis very rare—gland but little liable to inflammation." De Schweinitz calls the disease "mumps of the lacrymal glands, analagous to parotitis and at times associated with it; the acute variety very rare; the chronic more common." Fuchs says: It is extremely rare for the lacrymal gland to be the seat of disease. Among such diseases belong, first, inflammation-dacryo-adenitis; this may go on to resolution. In other cases suppuration of the gland with discharge of the pus externally has been observed, a fistula of the lacrymal gland remaining afterward. There have *even* been described cases of bilateral dacryo-adenitis which ran either an acute or *more frequently* a chronic course: some of these cases were complicated with simultaneous swelling of the parotid glands." Juler records: "This disease is extremely rare, the gland being in danger of breaking down and suppurating when it is to be treated as any other glandular abscess. The acute condition is to be combated by energetic antiphlogistic measures, leeches, hot water fomentations frequently applied and bandaging."

These references from published books, among recorded cases may be mentioned the following:

Dr. Pooley, of New York City, reported a case "under treatment for chronic trachoma that got up a diphtheritic inflammation of one eye; in recovery from this, a dacryo-adenitis in the other orbit, with pain, swelling and œdema of lids and chemosis, —treatment, hot water, quinine and iron, incision; got well." Dr. S. C. Ayres, of Cincinnati, reports a case "with thickening of lids, chemosis, lids swelled and thickened even with the forehead: resembled purulent conjunctivitis in its most acute stage." Dr. J. F. Fulton, of St. Paul, Minn., "one case reported, great pain and swelling one eye; treatment, leeches, hot water." Hirschberg: Mumps of the lacrymal—resembles outwardly infectious conjunctivitis; treatment, poultices: K. I. These cases were all reported some years ago; the limited time at the disposal of the writer making it impossible to look up the records of more recent writers.

The writer of this paper trusts he has been able to interest the members of the State Medical Society in this so rare a disease, a disease that is characterized by such alarming and striking symptoms.

# XLI. CONSTITUTIONAL STATE VERSUS CATARRHAL DEAFNESS

By SARGENT F. SNOW, M. D.

SYRACUSE

In addressing a body of busy practitioners and surgeons on chronic deafness, I clearly appreciate the difficulty I shall have in holding attention. The disease itself is naturally of little interest to you as compared with the many acute thoracic and abdominal cases that you meet, but these deaf patients, too, need help, and it is for us jointly to grapple the subject. In this disease it can truly be said that the full fruition of our hopes can best come from a combined effort of the specialist and family physician. It seems to be generally understood that chronic cases are unsatisfactory and beyond improvement. To be sure, we are told to try inflation of the ear, and if that does not relieve them, further attempts are useless, not even the specialist can help them, and I must confess that has been and is true in a few instances, but medical and surgical progress has decreed that an invariably poor prognosis shall not remain the rule. In fact, I believe that a good prognosis should much more frequently be given.

During the past fifteen years, cocaine as a local anæsthetic has made it possible to straighten nasal septums, remove exostoses, reduce enlarged turbinates, and so generally improve the catarrhal states dependent thereon, that a better condition of the ears and improved hearing is frequently noticed, and to-day we can class these intra-nasal states as among the most prominent causes of middle ear catarrh. These local intra-nasal factors must be taken care of before embarking upon a treatment of the deafness itself, but the mistake is often made that they are the whole cause, and too much benefit is expected from their removal. It is many times thought that the hearing will improve or at least, by treatment, be capable of improvement as soon as the morbid nasal states are out of the way, but in eighty per cent. of the cases this improvement does not come, and why? Simply because there is some unrecognized constitutional factor keeping the Eustachian tube occluded, and thereby preventing good returns from the best and most thorough operative work within the nose. A course of treatment attempted before this constitutional factor is removed will prove both unwise and unprofit-

able. At present our most effective way of handling chronic cases of catarrhal deafness is by jets of stimulative vapor under air pressure through to the middle ear, and no good can come from such treatment if the tube is stopped up by congested membranes. The skin, liver, stomach and other organs exert a great influence on head membranes, and any marked disturbance in their functions is sure to be followed by an increase of inflammation. No treatment for the relief of chronic catarrhal conditions will be effective if given while the body is covered by an inactive sensitive skin. The common habit of warm bathing, coddling and living in superheated rooms is most pernicious, and sure to be followed by membranes that are thick and loaded; with our modern environment it seems absolutely necessary to do something to counteract these tendencies, hence the observance of personal hygiene becomes one of paramount importance. As a rule, cold baths should be taken, but when impracticable, which is seldom, a brisk dry rubbing with a harsh towel not only starts a good reaction, but exercises the skin, an important step in promoting elimination, tone and vigor. Either or both of these measures can be depended upon to so toughen the surface that it ceases to act as a constant menace to the deeper membranes and organs. Head colds are not as common and nature has a chance to produce absorption of inflammatory products. Protection of the body should become less and less a problem of importance as the patient acquires a prompt skin reaction, but protection for a time has to be considered, and at all times so far as it relates to foot wear, the feet always needing to be kept warm and dry. Silk or wool are the best materials for undergarments, while the outer clothing should be selected to insure comfort.

That pathological states of the liver produce an increase in the thickness of membrane lining the Eustachian tube is too often noticed to be gainsaid. In fact, with some a torpid liver is the most prominent constitutional factor, and may block all our efforts to get local treatments through to the middle ear. The stomach and bowels also come in for their share of attention. Dyspeptic or intestinal disturbances, as well as uric acid, and uterine troubles produce an irritability of the mucous lining of the head, quite sufficient to necessitate their correction before the tubes remain normally patent. These phenomena of congestion and recongestion of weakened membranes from functional disturbances account in a large measure for the intractability of chronic catarrhal states.

Deafness in the subacute form, or in recent cases, may respond to rather crude methods of treatment, but when we meet the more aggravated forms, some of them that have been slowly

progressive for ten or twenty years, we have a different proposition before us, and but few specialists without an experience in general practice are equipped for the work, and not even then unless they be painstaking and persistent. Every little side issue must be studied to see what influence it may have on the ear condition. Habits and environment in the chronically deaf need scrutiny, for they are often pernicious and must be corrected, or it is better to advise the patient against further treatment. Professional reputation is too precious to be jeopardized by an attempt to handle such cases without the intelligent and willing cooperation of all intimately concerned.

Vigorous exercise can be made a great aid in relieving distended blood vessels of their load. It has been the author's frequent experience to find it impossible to keep the Eustachian tubes clear until the patients were persuaded to do vigorous, active arm exercise every morning as a routine; local treatments do little more and are not always within reach. Fleshy people are prone to avoid exercise, but they are not the only ones who need urging to physical exercise. We find them in all lines of clerical or professional work. These people practically use nothing but their brains; all their head membranes are in a state of passive congestion with dilated blood-vessels, which condition may be effectively relieved by vigorous arm movements. Surgical and therapeutic problems are often small as compared with the difficulty in regulating the diet and habits.

Cold bathing as a requirement is not such a hardship after a little practice, neither must one have modern bath conveniences; a wash basin will contain enough water to start a good reaction, and if used immediately after the exercise above mentioned will materially assist in starting the mucus and contracting the arterioles. The dry rub down at night acts in a similar manner and prevents taking cold after perspiring.

It goes without saying that necessary operative work within the nose must be done, and done thoroughly, for no one with a projecting nasal spur, pressing middle or prolapsed lower turbinate can avoid frequent congestions; but experience in otological work has proved to me that the reason why many attempts to relieve chronic catarrhal deafness result in failure, is principally because constitutional factors have not been appreciated. Treatments have been forced through an Eustachian tube still too sensitive, only to be followed by an unpleasant reaction and an increase in the bad symptoms.

To sum it all up, it is virtually impossible to successfully handle a case of chronic catarrhal deafness where there is low vitality, a sensitive skin, or frequent functional derangements,

whereas, without these obstacles, a correction of morbid nasal conditions make the disease, as a rule, non-aggressive and capable of much improvement, by stimulative vapor treatment through the middle ear.

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## XLII. A CASE OR SARCOMA OF THE TONSIL

By ARTHUR G. ROOT, M. D.
ALBANY

THERE is, in this case at least, the element of rarity to enlist interest.

The patient, Mr. J. W. M., sought me in consultation January 10, 1899, and gave the following history:

Age, twenty-three years; married; native of this country; occupation, printer; residence, Saratoga Springs, N. Y.

Family history: His father died at the age of fifty-seven years, from congestion of the liver and inflammation of the gall-bladder. His mother is living and well. Five brothers are living, one of whom has lateral curvature of the spine and some enlargement of the hip joint. The others are comparatively healthy. There is no history of any constitutional disease in the family, except that the patient's maternal grandmother is insane.

Personal history: He has had the usual diseases of childhood, and about eight years ago had an attack of grippe from which pneumonia developed, lasting about eight weeks, but has had no serious illness since. The present illness, which dates from a year ago, began with an ordinary cold, but a cough persisted. Deglutition was painful and the left tonsil became enlarged and painful and developed into an abscess, which was several times lanced. It remained permanently enlarged, however, so that solid food is now taken with difficulty. Some swelling and tenderness exist externally. He has had several small hæmorrhages from the tonsil.

Upon examining the patient's fauces, a large mass involving the whole of the left tonsil was seen. It pressed the anterior pillar forward and upward, and extended downward below the margin of the epiglottis. This mass was quite hard and showed a somewhat irregular surface, somewhat injected but without ulceration at any point. Upon introducing my finger into the mouth, the growth was found to have a large and firmly attached base, and gave to the touch that peculiar boggy feeling which though difficult to describe is so significant to the experienced digital eye. Internally nothing but the left tonsillar gland seemed to be involved. The pillars, the uvula (which lay over the upper margin of the growth), the right tonsil, the epiglottis and larynx were free and unimplicated. Externally the chain of lymphatic glands was to some extent involved, and pressure over the region of the carotid, where the common carotid divides into the external and internal, produced some pain.

The patient's general condition was fairly good. He had lost some

flesh, which was probably due to the fact that swallowing had been difficult and he was very much worried over his condition. An examination of the urine showed a slight trace of albumin, but no casts. Microscopical examination of small portions of the growth removed for the purpose revealed the fact that it was a short spindle-celled sarcoma.

When considering the treatment of such a case as this, it is difficult to think of a more perplexing and serious situation. All operative measures internally or through the mouth are useless, and there remains but one procedure—lateral pharyngotomy. I associated with me upon this case Dr. Albert Vander Veer, of Albany. After persuading the patient and his friends that the operation afforded the one chance for life, it was performed at the Albany Hospital on January 17, seven days after I first saw the patient.

An incision was made on the left side of the neck, extending from a point opposite the angle of the jaw downward and forward along the anterior border of the sterno-cleido-mastoid muscle to within an inch of the clavicle.

The chain of cervical lymphatics, which were considerably enlarged, ranging in size from that of a robin's egg to that of a pea, was thoroughly removed. The common carotid artery was uncovered and a ligature passed around it, and the ends secured with an artery clamp, so that the vessel could be quickly tied if it became necessary. Continued dissection showed that infiltration was very extensive, and it was soon necessary to tie the ligature which had been placed around the common carotid about an inch below its bifurcation. The neck now being pretty thoroughly cleared of infected glands and tissues, and the patient having been under anæsthesia for a considerable time, it was thought best to stop and rally him, with the expectation of continuing when conditions would permit. Consequently, the patient was put to bed and stimulated. The temperature in the morning before the operation was 98.6° F., pulse 92. After the operation the pulse ranged from 84 to 103, and the temperature between 98.3° F. and 102° F. Gauze drainage was used and the wound healed very kindly with but slight discharge.

On January 23rd the second operation was performed. The original incision was opened and continued upward and backward along the anterior border of the sterno-cleido-mastoid to the mastoid process. Another incision was made across the angle of the jaw nearly at a right-angle with the first, and about three inches in length. The muscular structures were dissected from the jaw-bone and a chain-saw passed around it just anterior to the juncture of the ramus and body. The bone was divided at this point, disarticulated and removed. The portion of the wall of the pharynx which now presented was carefully dissected out, hæmorrhage being easily controlled. The portion of the pharynx which remained was stitched together, a small opening still existing between the wound and the pharynx. The external wound was closed with a continuous suture of catgut and drained with a rubber tube from its most dependent part. Following this operation the pulse was 90, rather weak, rapidly rising to 108 and becoming quite weak, but the patient responded well to stimulation. He was fed on stimulating enemata of liquid peptonoids and milk (of each two ounces, whiskey one ounce), every four hours. Small bits of gauze saturated with

ice-water were kept in the mouth to relieve thirst and hypodermic injections of morphine were given to relieve pain.

The patient was discharged from the hospital February 23, 1899.

In the subsequent history of the case I am indebted to the reports of Dr. William E. Swan, of Saratoga, in whose care I placed the patient, and to occasional reports from the patient himself.

*March 12, 1899.* Dr. Swan reported "remarkable progress in his case so far as his general condition is concerned.....the wound broke down for some two inches at its lower extremity, but this has filled in rapidly and is nearly closed. He has gained very much in color and strength. Temperature and pulse normal, and he is up and about the house a few hours daily, fully dressed. His wounds and soft palate look somewhat reddened, but no tumor or new growth seems to be visible."

*March 24, 1899.* The patient reported that his gain in health was steady and rapid, and the wound quite healed.

*May 1, 1899.* Dr. Swan reported that no recurrence of the growth could be detected anywhere, and that the patient ate well and gained forty-seven pounds in weight in eight weeks.

*June 9, 1899.* Dr. Swan reports "a continuous improvement in every way. Patient is cheerful and hopeful and attends to some light business."

*June 21, 1899.* I saw the patient at Saratoga and found jaw and fauces in good condition. No recurrence could be made out at this time, five months after operation.

*July 25, 1899.* Dr. Swan reported that "the anticipated return of the sarcoma in the case of Mr. J. W. M. has taken place, involving the lower jaw and surrounding tissues. Some days ago I placed him under ether and cut down on the inferior maxilla and scraped out as much of the growth as possible.....the wound has closed, but the growth of the neoplasm is quite rapid, and I look for the end before the lapse of many months."

*October 1, 1899.* Dr. Swan reported as follows: "I saw him on the street some two weeks ago. The mass on the affected side of his face and neck was the size of a large cocoanut, but he was cheerful."

The patient died a few weeks after this report.

I find, on looking over the literature upon this subject, that some forty-five cases have thus far been reported, but most of them in so incomplete a manner as to be valueless. It is because, in so few reports, the operative measures taken have been even mentioned or the subsequent history given, that I have reported these details at such length. Most of the cases reported have been in males, and most have occurred at the age of forty.

In concluding this report, I wish to express to my dear friend and colleague, Dr. Albert Vander Veer, my best thanks. To his judgment, his encouragement, and his skill, I could not give too great praise.

# XLIII. THE SIDEROSCOPE

By THOMAS R. POOLEY, M. D.

NEW YORK CITY

The sideroscope is an instrument for the demonstration of the presence of particles of steel or iron in the eye. The direct purpose of this communication is to show that the writer was the first to employ the magnetic needle for the purpose of determining the presence of steel or iron in the eye.

In June, 1880, I read before the American Medical Association, Section of Ophthalmology, which was then in affiliation with this society, a paper entitled "On the Detection of the Presence and Location of Steel and Iron Foreign Bodies in the Eye by the Indication of a Magnetic Needle," and published a preliminary notice thereof in the *Archives of Ophthalmology*, Vol. ix, 1880, page 219. In the next number of these *Archives* I published the article in full.

My attention was directed to the subject by my brother, the late Dr. J. H. Pooley. He had been experimenting on the application of the use of a magnetic needle to detect the presence of steel or iron foreign bodies broken off in the tissues. The results which he obtained were subsequently published in *Gaillard's Medical Journal*, 1880. It appears from this communication that the principle employed is not new and had already been used in surgery. A reference to the literature upon this point is to be found both in his paper and mine.

It at once occurred to me to determine the value of this method for the detection of foreign bodies in the eye and led me to carry on a series of experiments in the laboratory of the New York Ophthalmic and Aural Institute. These experiments had for their object: 1. To determine whether unmagnetized particles of iron or steel would exert sufficient influence on a magnetic needle to indicate with certainty their presence at a distance sufficient to make such method valuable in their detection in the eye. 2. To determine the practicability of rendering such particles magnetic at such distance as to be able to take advantage of their increased effect on the magnetic needle for the detection of their presence and location in the eye. A magnetic needle forty-one millimetres in length was suspended over a scale; particles of steel and iron of various kinds and sizes, as shown in the tables, were brought near it, and the distance at which there

was a marked deflection noted. 3. A simple bar magnet of forty centimetres in length, four centimetres in breadth and six millimetres in thickness was passed several times over the piece of metal at the distance from it given in the table. The results thus obtained, without going into tedious detail, is given in tabular form, and it enables one to see at a glance the result of these experiments.

Another series of experiments was then conducted on the freshly enucleated eyes of pigs and sheep, which consisted in introducing steel and iron particles therein and then testing for their presence with a magnetic needle both before and after they had been rendered magnetic themselves.

In the first of these experiments the suspended magnet employed was an ordinary sewing needle, which had been rendered highly magnetic by contact with a strong horse-shoe magnet, then delicately balanced, suspended by a fibre of silk, and for convenience of manipulation attached to the handle of a camel's-hair brush or rod. In the next three experiments a needle pointed at both ends with the eye in the middle, which was made for me by Philip Schmidt, was used. In all the rest a needle made by Benjamin Pike's Sons, which was described in the first set of experiments, was employed. These several needles were about equally delicate.

To render the enclosed bodies magnetic a horse-shoe and a bar magnet were employed, the latter being the one generally made use of. To accomplish this the magnet was passed over the suspected part several times and in several directions. To avoid any ambiguity in these experiments proper care was taken to remove the magnets and all steel or iron instruments to a sufficient distance so that their influence would not affect the needle. Precautions were also taken to use no instruments in the introduction of steel and iron particles which were themselves magnetic.

From this series of experiments the following conclusions were drawn:

1. The presence of a steel or iron foreign body in the eye when of a considerable size and situated near the surface may be determined by testing for it with a suspended magnet.

2. The presence and position of such a foreign body may most surely be made out by rendering it a magnet by induction and then testing for it by a minute suspended magnet.

3. The probable depth of the enclosed foreign body may be inferred by the intensity of the action of the needle near the surface.

4. Any change from the primary position of the foreign body

may be ascertained by carefully noting the changes indicated by the deflection of the needle.

In concluding this paper the writer adds: "Much may yet be done to perfect the method. It seems to me especially desirable that a more delicate needle than I have been able to obtain should be made use of. It is not too much to say that my studies of the method lead me to predict a useful future for it in practical ophthalmology."

In the same number of the *Archives* (*loc. cit.*, p. 207) Dr. Herman Knapp has an article on "Two Cases of Removal of Fragments of Iron from the Vitreous." In the remarks thereon he says: "Powerful magnets have been passed by Dixon and others over the outer side of the sclerotic by which manœuvre chips of steel floating in the vitreous have been moved and drawn toward the wall. Far more important, however, appear to me the results of experiments which Dr. T. R. Pooley has of late been conducting in the laboratory of the New York Ophthalmic and Aural Institute, and of which he has handed me a preliminary communication to be published in the present number of these *Archives*.

"These experiments were based on the principle that if a fixed magnet attracts a movable piece of steel, a fixed piece of steel must attract a movable magnet. Simple and well-known as this principle is, it is strange that no one before Dr. Pooley has applied it to the eye, so much more since it has been used with advantage in general surgery."

In the tenth volume of the *Archives of Ophthalmology*, 1881, page 145, appears an article written by Dr. Herman Pagenstecher, of Wiesbaden, entitled "Two Cases of Extraction of Splinters of Iron from the Vitreous," with observations on the diagnosis and extraction of steel and iron particles by means of the magnet.

Referring to the second of these cases in which it was doubtful whether the foreign body which entered the eye was a stone or iron fragment, he says: "This gave me the incentive to make the experimental inquiry, whether I could not succeed in proving from the existing condition by use of the magnet if we had a steel or iron foreign body in the vitreous, especially as T. R. Pooley, in the visit which he made to our institute in the course of the summer, said that he had been successful in so doing. Pooley's paper, including his preliminary communication, was not yet known to me when I made my experiments. It had, however, already appeared in the American edition of these *Archives* and in any case secures for him the priority of this valuable means of diagnosis. I can only give my assurance

that in my experiments I was soon led to the necessity of rendering the foreign body magnetic. I accomplished this by repeatedly touching the eye under examination by a strong electromagnet. I allowed the needle used to indicate the presence and position of the suspected foreign body, to rotate as in a compass on a fine needle. Pooley suspends the same by a fine thread by which it is rendered more sensitive, although the difficulty of experimenting is thus somewhat enhanced. The results obtained by Pooley in his experiments I can on the whole fully confirm."

The prediction which I then made of a useful future for this method in practical ophthalmology has been most fully realized. My communication as well as that of my distinguished colleague, Dr. Pagenstecher, after a period of apparent indifference gave rise to a number of publications upon the subject. These, however, I have not here time to enumerate, as I here only wish to call attention to the perfecting of the method by making it more available for practical application through the invention of two instruments which have lately been introduced, under the name of the sideroscope, one by Dr. Edward Asmus,[1] then assistant surgeon in the University Augenklinik in Breslau, but now of Düsseldorf. His instrument, without going too much into detail, consists merely in making an improved magnetic needle more available for practical application by the addition of a scale and a telescope. Since then Dr. Hirschberg, of Berlin, in the *Centralblatt fur Augenheilkunde,* Vol. xxiii, 1899, p. 285, describes another instrument which he has invented, which, however, is only a modification and simplification of Asmus's instrument, which is essentially the same except that the telescope attachment is left out and the deflection of the magnetic needle by means of a small reflecting mirror thrown upon a screen divided into a scale which measures the deflection of the needle.

It has been, I think, sufficiently well demonstrated by this communication that the priority of the discovery of this instrument which now promises to come into universal use, belongs to the writer of this paper as much as the discovery of the ophthalmoscope by Helmholz belonged to him, for it is equally true of his discovery that a vast improvement has been made on the original instrument of which he made use. The sideroscope can be obtained of E. B. Meyrowitz, 104 East Twenty-third street, New York City.

1 Das Sideroskop, *Arch. für Ophthal.*, Bd. xl., 1894, p. 280.

# XLIV. PATHOLOGY OF GLIOMA OF THE RETINA, WITH CLINICAL NOTES OF A RECENT CASE

By EDWARD S. PECK, A. M., M. D.
NEW YORK CITY

THIS case of retinal glio-sarcoma is brought forward on account of the comparative rarity of the disease, and its interesting pathological exhibit.

Early in December, 1900, there came to my clinic at the Post-Graduate Medical School, in New York, a boy of thirteen months, whose mother gave the following history: Soon after the birth of the child the mother noticed an enlargement of the left eye-ball, a bluish-grey look of the sclera, a very broad cornea, and a vacant stare. When first observed by her the eye apparently had sight. After a few months she sought advice for what seemed to her a sightless eye. Her story was, that she had for six months consulted at nearly every eye-clinic in New York and received, with but one exception, the same advice, viz.: that a tumor existed within the eye-ball, that the eye was sightless, and that early removal was necessary. At the age of thirteen months the appearances were as follows: the eye-ball was twenty-five per cent. larger than its fellow; the cornea was three millimeters greater in its horizontal than in its vertical direction; the eye-ball showed increased tension; sclera was decidedly bluish; cornea was transparent; pupil was largely dilated, and failed to contract by eserine; the pupillary area was quite well filled with a pink and yellow reflex, showing retinal vessels of good size coursing in an horizontal direction across it. There were no appearances of staphyloma in either of the protecting tunics, and motility in all directions was good. A diagnosis of well-developed glioma of the retina was made, and immediate enucleation was advised. This advice was given as the right, or fellow, eye was apparently free from disease and as the child was well nourished. As the child was thirteen months of age, and had the proper number of good teeth, the mother was advised to wean it—which advice was followed.

After continuing her visits to various other similar institutions, the mother finally consented to the enucleation of this eye, which was accomplished by me without incident in June, 1901. The optic nerve was abscised as far back as the small orbit would allow. The organ was placed in a preparation of formalin, and specimens were made a few months later. Photographs of the patient, and of the organ after removal, were made and are here shown. After detention in the Post-Graduate Hospital for five weeks the wound promptly healed, and the child rapidly improved, but the mother preferred to remove the child to her home rather than to accept the proffer of a six weeks' stay at the Country Home of the Babies' Wards at Seacliff, Long Island.

Early in September, or three months after enucleation, the child was returned to the clinic with a proliferation of new growth in the roof and conical depth of the orbit; not satisfied with the advice to wait two weeks

for observation, the mother sought other counsel. I learn that late in September the orbit was eviscerated of its contents by Prof. Carl Beck, at the St. Mark's Hospital.

On November 29th the growth had reappeared, invading the orbital roof, when it was again interfered with by the same surgeon and a portion of the bony roof was removed. The child died the next day, November 30th. Dr. Beck reports the pathological structure of the neoplasm as a round-cell sarcoma—pigmented—with very little connective tissue.

*General Remarks.* This was the sixth child of healthy Hebrew parents, and no history of malignant growth of the eye, or of any apparatus of the body, could be made out for three generations. Of the other five children, one died in its first year of entero-colitis, while the other four had always been unusually healthy. Of these four children, three are hyperopic, two of whom show marked double convergent squint. On one of the two squinting children, an operation for the relief of the deformity is under consideration at the present time.

*Diagnosis.* Liability to error is easy in the early stages of glioma, especially in the so-called ophthalmoscopic stage, when the mirror brings out quite nicely the granular changes of the retina near the optic nerve.

1. Glioma, or fungus hæmatodes, may be mistaken for plastic deposits, lying either in the vitreous humor, or more anteriorly just behind the ciliary body in whole or in part—which are the results of slow, subacute, or even chronic cyclitis, or iridocyclitis. In this disease the pupil is invaded, an abnormal reflex is obtained by the mirror, and ocular tension may be increased. Retinal vessels are, as a rule, absent and detachment of the retina may, or may not, exist, according to the amount of infiltration of the granular layers of the retina. Iris and lens may be pushed forward.

In plastic cyclitis or exudative choroiditis the rule is—the eye is soft, not hard, the iris and ciliary body are hyperæmic, the sclera is injected—and the whole picture is one of an inflammatory process. While it is easy to confound this condition with the secondary stage of glioma, it would be a mistake to remove one eye for the inflammatory process alone.

2. Glioma may be mistaken for metastatic choroiditis. But the history and clinical symptoms of a deep-seated inflammation indicate the latter, and not glioma. In addition some antecedent brain lesion, such as a true basilar meningitis, or of both brain and spinal cord, such as a cerebro-spinal meningitis, or of some infectious disease, as a serious blood-poisoning, has transpired, of which the metastatic choroiditis is a grave secondary symptoms. Glioma may occur in an eye having such symptoms, and

may mask the latter; in such an event an incision to relieve the suppurative process would reveal the glioma. One such case has been reported, in which the cornea was in a condition of suppurative ulceration.

3. Cases to whose pathological process the term pseudo-glioma has been given, because the deposits within the eye-ball are the result of previous inflammatory processes of choroid, retina, ciliary processes, or vitreous humor, and which, sooner or later, become gradually absorbed. These deposits may be also the result of a highly emphasized strumous cachexia: in both instances they may run their course in correspondence with a true clinical picture of glioma—with this distinct difference, that they do not necessarily eventuate in a gross enlargement of the eye-ball, and destruction of sight. In such cases delay is not dangerous, and the organ should not be removed too early.

4. While sarcoma of the choroid simulates glioma of the retina, though it does not come usually in patients as young as those who are victims of glioma.

5. Simple detachment of the retina may simulate glioma in the so-called ophthalmoscopic stage, but it does not require an intimate knowledge of the use of the ophthalmoscope to differentiate between them. Retinal detachments show the picture of a beautiful arrangement of bluish-white waves, most often in the inferior sectors of the eye-ball, which are generally sharply limited by healthy pink-red retina, or disappear in tightly-drawn white fibrous lines. Glioma, even of the rare glio-fibroma type, shows a pulpy mass welling up towards the pupil, with a bluish-grey, or bluish-yellow, field, giving the visual impression as if the intra-ocular area were stuffed with a colored ball, whose reflex is not unlike that of a hard billiard ball. In detachment of the retina the eye has lost intraocular tension; in glioma it has gained it. In detachment there is no pain; in glioma there usually is considerable, although in the case here presented it was not present.

Lastly, glioma of the retina is a malignant tumor, peculiar to infant life, rarely being first observed later than the third year of life, and killing the patient within two years thereafter. It is a granuloma of the inner or outer granular layer of the retina; consists of small round cells, a small amount of intercellular substance, and many blood-vessels distributed in the intercellular substance. It always starts in the retina, and may grow inwards or outwards. When the tendency to growth is outwards, bulging of the globe occurs, until it gives way by pressure-ulceration, metastases occur, and the patient is carried off by malignant infection.

*Treatment.* The diagnosis of glioma being made, prompt removal should be insisted upon, even of an eye retaining some sight. There is no other course of procedure. In the removal the attempt should be made to make the optic neurectomy as far back in the orbit as possible. For this purpose the eye should be drawn well forward by strong tooth-forceps, and the optic nerve should be cut close to the optic foramen. If the neoplasm has entered the proximal cavities, operation is contra-indicated.

The following macroscopical and microscopical memoranda were made by Dr. Edgar S. Thomson, pathologist of the Manhattan Eye and Ear Hospital, to whose laboratory the eye-ball was sent:

The eye, which measured twenty-three millimeters from the summit of the cornea to the optic disc, was hardened in formalin, bisected, embedded in celloidin, and sectioned. The gross appearances were those of an extensive retinal neoplasm, which was pale grayish-yellow and filled almost the whole of the vitreous chamber. It seemed to extend directly into the optic nerve, which was thicker than normal and of the same color as the retinal growth. The growth was in places thin and necrotic, while in others it pushed up in mounds into the vitreous.

The microscopic appearances were as follows: Cornea, normal; anterior chamber, deep; iris, densely infiltrated with round cells and very thin and atrophic; it is adherent for fully two millimeters beyond the filtration angle, to the cornea; ciliary body, infiltrated and markedly atrophic, as was the iris; lens, normal; sclera, normal; retina, entirely lost in the growth, no trace of its original structure remaining; choroid, infiltrated with round cells (leucocytes) and much thinned; in a few places the growth has invaded the choroid slightly; optic nerve, infiltrated by the growth as far back as where it was divided; growth, springs from the retina and has pushed forward into the vitreous; it is composed of small round cells with large nuclei and is very vascular. The peripheral portions (near the choroid) are necrotic and stain poorly. There are no spots of calcareous degeneration, but a large amount of pigment lies in the cells in small particles, and in larger masses, between the cells. This pigmentary degeneration is confined to the necrotic portions of the tumor. The blood-vessels are full of blood, and in places the walls are somewhat thickened. The central portion is well nourished and stains well. It extends directly into the optic nerve, spreading along the nerve fibres in the usual manner. The lymph spaces of the nerve sheath are not infiltrated. In one place, beneath a choroidal nodule, the tumor cells extend along a posterior ciliary vessel, passing almost entirely through the sclera.

*Diagnosis:* Glioma retinæ.

*Prognosis:* Absolutely bad.

*Remarks:* The microscopic appearances indicate a rather advanced stage of glioma with secondary glaucoma and inflammatory infiltration of the iris and ciliary body. The central part of the tumor is the "youngest," and the infiltration of the optic nerve must have occurred later than any other infiltration. Local recurrence and invasion of the brain are almost inevitable.

# XLV. THE PRESENT POSITION OF OPHTHALMIC SCIENCE AND ART

By D. B. St. JOHN ROOSA, M. D.
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Ophthalmology is one of the oldest of the specialties of our science and art. That it is properly so has been almost unanimously acknowledged by the profession from the beginning of the time when surgeon oculists began to exist, which may be said to be, in round numbers, perhaps one hundred years ago. Since then, and especially in the last fifty years, ophthalmology has grown so luxuriantly in its various fields that it has become subdivided, in some few instances, as a specialty. Here and there members of the profession have devoted themselves almost exclusively to the correction of defective vision by the adjustment of glasses, while inflammatory conditions, or infections, and those requiring operation, have been passed on to others, who, in their turn, paid relatively little attention to optical defects. An attempt has also been made by some manufacturing opticians in various parts of the world, without an education in general medicine, to assume the care of all the conditions of the eye requiring glasses. In this State they have sought legislation to constitute a separate professional class, and yet this class of opticians has never contributed anything at all essential to our knowledge of the conditions of the eye requiring glasses, or to that pertaining to the character of lenses to be used. Such a subdivision, either in the profession or out of it, if generally made, would be detrimental to the interests of the public, and, on this ground, should never become a system of practice. The specialties in medicine have reached, perhaps, their utmost limit. There will be always a large rank and file of all-round men of the first order, and those who are at work in special departments should be able, when necessity occur, to become fair general practitioners. Our ideal practitioner is not one who knows a great deal of one thing and nothing at all of others; but, rather, one who knows a great deal of many things, and who must devote himself to some special investigations for the greatest good of the greatest number.

But I may not dwell on this interesting inquiry of how far "specialism" is beneficial to the human race, and what limits should be put to it. I pass on to the subject of the hour, and I propose to inquire with you, How stands now ophthalmic science

and art, since its great masters—those who placed it in the van of the progress of medicine—are gone?—Mackenzie Sichel, Donders, Graefe, Arlt, Jaeger, Horner, Desmarres, Bowman, Critchett, Wilde; in our own country, the two Williamses, Agnew, Loring, Noyes, and many others, an enumeration of whose names is a recognition of their great service to the race. How have they left the field, has all the needful work been done by them, and have we reached a point where we simply cultivate plants, already well grounded in a soil well prepared by our predecessors? Our answer to all this must be qualified. There are certain departments of ophthalmology in which no essential advance or discovery has been made in the last twenty-five years. After Helmholtz gave us the ophthalmoscope, if we had stopped with his plane mirror, difficult to manage, and not to compare with the simple instrument of Liebreich and his contemporaries, we should have been handicapped with an imperfect method of examination. All that Helmholtz did—but what a mighty *all*—was to provide us a means—imperfect it is true, but a means—for doing that which was hitherto impossible—of examining with tolerable but not complete ease the retina, the choroid, the vitreous, the lens, and the optic papilla.

Until this time, while here and there were even exhibitions of luminous eyes, no one found out the means of making them so, and the principle of optics upon which this illumination depended. One of our own number, Edward G. Loring, gave us the final contribution to ophthalmoscopy—an instrument by which we could thoroughly and easily determine the refraction of the eye. The tilting mirror, suggested by Wadsworth, of Boston, made a perfect instrument, as it remains to this day. If no modifications had ever been made since these two men gave us the perfected instrument ophthalmology would have lost nothing of importance which may be revealed by an ophthalmic mirror. Yet, no sooner was Loring's ophthalmoscope announced and described, than modifications and alterations, chiefly of a trivial character, began, and none but the tilting mirror was important.

Helmholtz also invented the instrument for measuring the radius of the cornea—the ophthalmometer. Helmholtz first did the thing, and gave us the instrument by which an expert in a laboratory, with plenty of time at his disposal, could make a corneal measurement. Valuable results came from the use of this ophthalmometer, or keratometer, as perhaps it should be called. One of our own members, Knapp, with Donders, was the first to avail himself of the instrument as then presented, as well as Dyer, in this country.

But these arduous labors were scarcely ever repeated, and the ophthalmometer of Helmholtz passed into the limbo of unused inventions. After many years of research and trial, Javal, a French Alsatian, and Schiotz, his Norwegian assistant, at the Sorbonne in 1881, gave us an instrument by which an ordinary practitioner, after a few hours of experience, under a teacher, may, in two or three minutes, accurately determine the vertical, horizontal, or oblique radius of curvature of the human cornea. Here, also, the work of modification immediately began. But, as after Loring the ophthalmoscope was invented, so the ophthalmometer, as left by Javal, remains entirely satisfactory for its important purposes. The general use of the ophthalmometer is rapidly simplifying our methods of determining the proper glasses to be worn by those who have marked optical defects. I say "marked" advisedly, because we have learned that many departures from a so-called normal condition may exist, without any necessity for the wearing of glasses. The ophthalmometer does its great work because, on the very threshold of our investigations of the refraction of the eye, it quickly determines that which was formerly difficult but always important to learn—the presence or absence of corneal astigmatism of any degree, high or low.

If we consider the present condition of inflammatory affections of the conjunctiva and cornea, while it is not at all certain that a greater number of cases are cured than under the old methods, which still retain their usefulness, certainly our knowledge has become much more exact since the discoveries of Lister and Koch and Weeks, and we have learned of aseptics and antiseptics and bacilli, and we know why we use silver nitrate and copper sulphate, and so on. We had been using antiseptic remedies without knowing exactly in what specific way they acted, if, indeed, we are now sure. As has been intimated, nitrate of silver, sulphate of copper, alum for the conjunctiva, and carbolic acid for the cornea were used long before the present supposed principle of their action was known probably with as great success. The ophthalmia of the new-born, however, now receives immediate and rational treatment, and the frequency of the continuation of the infection has been very much diminished by Credé's investigations.

In trachoma, the mechanical treatment has made a great advance in our means of relief. We have also learned the contagiousness of all conjunctival affections, as we did not know it before. A United States examining surgeon will now send back a European immigrant affected with trachoma, realizing, as he does, the importance of not spreading this condition, so

likely to be destructive to sight. The writer of this discourse actually encountered, on a vessel going to Liverpool, through the courtesy of the ship's doctor, two Finns, who had been wisely rejected by our authorities as not being proper immigrants to enter this country, because they were affected with trachoma, which, to the credit of the American examining officer be it said, could not be detected except by a thorough turning over of the upper lid by a little manipulation not always easily accomplished, except by an expert.

A great advance has been made in the treatment of myopia of a high degree by the invention of the method of lessening the refraction of the eye by removal of the lens. Very high degrees of myopia, as is well known, are so disabling as to be worthy of relief in this manner. From my own observation, in Swiss and German hospitals, I judge there are more cases in those countries of such degrees of myopia than in France, England, or our own country.

In the matter of strabismus, advance has been slow, and not widely spread. We are not yet fully in the open. This, I am inclined to think, is due, in some part, to the excessive zeal and enthusiasm exercised by those, especially in our own country, who were led astray by the astonishing revelations of the value of glasses in hypermetropia and astigmatism. A large class of people, up to the time of Donders, were, except in isolated cases, left without aid to their vision, although the means of relief were actually at their side, though unseen. These enthusiasts, going very far beyond the masters, beside the cure of headaches and defective eyesight, found in errors of refraction the source of epilepsy, idiocy, chorea, and a great number of diseases of the nervous system. They claimed that "difficulties attending the functions of accommodation and adjusting the eyes in the acts of vision, or irritations arising from the nerves involved in the process, are among the most prolific sources of nervous disturbances." Driven from their untenable position by the exact observations of those who followed them, they took refuge in a position in which they are still in some force. Again, I say, *especially* in this country. The claim now made in certain quarters is that in the want of exact equilibrium of the eyes, very often latent and only to be determined by a measurement of the power of given muscles, at certain times, is to be found the source of a large class of diseases, whose origin has been hitherto unsuspected. This latter theory of the great importance of a latent defect has been much disturbed by measurements of people in good health, without asthenopia, who were found to have exactly the same conditions that were supposed to do so much

harm. But the results of the practice of division and partial division of the ocular muscles for the relief of these conditions, which were often unsuspected by the patient, and only with difficulty to be determined by the observer, soon excited grave doubts as to whether, after all, the whole human economy depends on the question of the action of the muscles of the eye-ball. And all this, as I have intimated, led to a neglect of the study of a positive condition, strabismus, a deformity which leads not only to blunting of the vision of one of the eyes, as now may, I think, be safely said, but also produces a marked deformity, which gives rise to great mental trouble to many of those affected with it, and gives them a distressing appearance to the observer. But in our time this is being studied, and we are moving toward positive rules of action, although much diversity of sentiment exists as to the proper methods of operating.

Javal and Panas in Paris, and their followers in this country, have done very much to rescue this subject from the field of mistaken conclusions in which it was left by Graefe, and which were increased a thousand-fold by mistaken zealots in this country. The study of so-called "latent squint," and of concealed irregularities and deficiencies in the action of the ocular muscles, has delayed very much what is, I hope, before us for its relief, in Javal's methods of obviating the necessity for operations in many cases, and Panas's rational operations when necessary. We are now much more sure of what we can do, and that is to restore the normal position of the eyes, and, in rare cases, to secure binocular single vision.

The mistaken conclusions of Dieffenbach, who first proposed operative means for the relief of stranbismus about fifty-five years ago, led to sanguine hopes which could not be realized, for the deformity was supposed to depend upon something morbid in the muscle. This, at the most, we now know to be a spastic condition, while the origin of strabismus, as Donders endeavored to show, is found in fixed conditions of the eye-ball.

In senile cataract, we have made most satisfactory advance. Fortunately operators, as distinguished and skilful as Graefe, Arlt, Desmarres, Agnew and Williams, might perform ideal removals of the lens, in the best technique of the time, and yet suppuration and destruction of the eye result. After the general introduction of Graefe's narrow knife, instead of the old broad instrument, the percentage of losses was sensibly diminished. But, until aseptic treatment was fully understood and practiced, and a local anæsthetic, cocaine, provided by Koller, the most bitter disappointment often befell the most skilful operators. Now, that the instruments can be so cleansed that

they are incapable of carrying infectious disease, and the dressings made absolutely aseptic, and the eye made perfectly insensible to the pain of the operation, the cases of suppuration have diminished to such an extent that a patient in fair health, with cataract, has better chances of a good result, with an operator of average skill, who is exact in his aseptic technique, than he formerly had in the hands of the most renowned operators of the world, when the causes of failure to heal the wound by "first intention" were utterly unknown, and when the patient might ruin his eye by his own movement during the operation, or in the vomiting from the effects of the ether.

In the matter of after-treatment of the capsule, and of iridectomy coincidental with the corneal sections, much of interest remains to be said to specialists. Here the most diverse opinions are still held. No common ground has been reached, and much remains to be done before we are agreed on all these points. But this we may say, that the chances of good vision in our time have been raised from, say sixty per cent. to ninety per cent., by cocaine, the narrow knife, and aseptic treatment of the dressings, the instruments, and the eye.

We are also in an advanced position in the matter of operative procedures for the removal of iron and steel foreign bodies. The use of the magnet, first, the small ones, and, finally, the great one, invented by Haab, of Zurich, have greatly facilitated these removals. In what proportion of cases, after the thorough removal of the septic body, it may still destroy the eye, remains to be shown. For the entrance of a foreign body into the eye-ball, through the ciliary region, in spite of its thorough removal, will generally involve the loss of the eye as complete as that of a plate of glass when broken by a stone. But the removal of the foreign body, without great damage to the tissues in the process, gives us hope that we may lessen the cases of complete loss, and, better still, perhaps, of sympathetic iridochoroiditis.

The questions of the complete or partial enucleation of the eye for cosmetic purposes, or the prevention of sympathetic inflammation, the use of glass balls, and the like, as a substitute for the vitreous humor, are still widely discussed; but there exists no doubt in any mind that eye-ball must be, as to its principal part, promptly removed, should it be in danger of exciting sympathetic inflammation. The discovery, by Bonnet, of the method of enucleation of one eye for the relief of the other, however it may be done, still has the complete sanction of the profession. This, of itself, has been a tremendous advance.

In acute glaucoma, the same triumphs are achieved to-day as when Graefe first operated on the Berlin shoemaker. But when

we come to speak of chronic glaucoma, we have a disease which may be mitigated, and whose advance may be delayed, but whose cure, as yet, remains usually impossible. While thousands of patients have testified by their rescue from blindness to the value of iridectomy in the acute form, yet it is only a few years since a New York surgical teacher considered the removal of a piece of iris, for glaucoma, as senseless an operation as would be the removal of a part of the peritoneum for peritonitis. It is only with a patient with an insidious narrowing field of vision, intermittent attacks of increased tension without pain, that we are tossed on a sea of doubt, in spite of the value of iridectomy in acute disease. It is possible that much remains to be done in the classification of what may be called "non-inflammatory glaucoma," and the new operation of removing the cervical ganglion of the sympathetic nerve is worthy of a fair trial.

Thanks to the thousands of investigators, and the excellent drawings of many of them, our knowledge of interior ocular accidents and infections—retinitis hæmorrhagica, retinitis syphilitica, optic neuritis, choroiditis, atrophy of the optic nerves—becomes more and more exact. But this knowledge does not, in every case, lead to hopes of cure. Detachment of the retina, probably always, except in traumatic cases, preceded by diseases of the choroid and vitreous, remains disastrous and incurable. Advance here must be looked for in prevention of the condition which makes detachment possible.

It is useless to hope that all disease is to be cured, or, as I should rather say, prevented in our time, whatever future ages may have in store for the human race. But we all admit that an exact and thorough diagnosis mitigates much of even incurable disease, and ultimately leads to better results. Certain it is, that in no department of our science and art are there more brilliant results of cure and relief by mechanical and operative interference than in what is known as ophthalmology.

With advantages much less than those to be obtained on the Continent of Europe, we, in this country, have made a good showing in the progress of the last fifty years. Could there be secured to us in the large cities better facilities for more exact and thorough observations, without regard to the pressing claims of private practice, much more would be achieved in American laboratories, hospitals and infirmaries.

# XLVI. A CASE OF OTITIC BRAIN ABSCESS; AND THE LESSONS WHICH IT OBVIOUSLY TEACHES

By ROBERT LEWIS, Jr., M. D.
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This patient, R. C., the history of whose brain and ear disease I have the honor to present for your consideration, was admitted to the New York Eye and Ear Infirmary, in the service of Dr. Gorham Bacon, on the twenty-third day of January, 1901. From her and from her friends the following history was obtained: Since her childhood (the patient is now twenty-three years of age) she has had an almost constant purulent discharge from her left ear. This discharge has, at times, been thick and foul smelling, and has contained small, granular, masses, doubtless of cholesteatomatous character. Ten months ago, at a time when the discharge had apparently ceased, she complained of pain in the ear. An ice coil was applied by her physician and the pain subsided. At the same time the discharge reappeared. On several subsequent occasions she complained of headache which was of a general character and not located at any particular point.

The attack which caused her to visit the Infirmary for relief began on Sunday, January 13th, with a cold. On January 14th the discharge had ceased, but she had some pain and tinnitus in the affected ear, as well as headache on the same side of the head. There was no dizziness or nausea. The patient continued to grow steadily worse, and on Thursday, January 17th, complained for the first time of chilly sensations and of pain in her back. Her medical attendant made the diagnosis of "grippe."

On January 18th, the patient had a severe chill which lasted twenty minutes; her teeth chattered and she shook convulsively. Temperature rose to 104° F., but was not followed by any perceptible perspiration. The pain in the left side of the head became severe and extended down the side of the neck; the mobility of the latter was normal. The lower extremities were rigid. Some vomiting occured, but it was not of a projectile character.

On Saturday, January 19th, at one p. m., the patient had a chill lasting eight minutes, which was followed by a rise of temperature and sweating with much exhaustion. At seven p. m. she had a second chill which lasted twenty minutes.

January 20th. Another severe chill lasting twenty minutes. This was followed by fever and sweating, muttering delirium, and a tendency to drowsiness. Previous to this time her mind had always been perfectly clear.

On January 22nd, a slight left facial paralysis was noticed. No chill occurred on this day, but the patient was very weak. Amnesic aphasia also appeared on this day for the first time. The drowsiness continued.

On January 23rd, the patient was admitted to the Infirmary and I saw her for the first time. A physical examination showed the left mastoid to be slightly tender over the antrum and tip, and over the opening for the emissary vein. There was no œdema over the mastoid. The external auditory canal contained an abundance of foul discharge. On the pos-

terior wall of the cartilaginous portion there was a furuncle. There was no tenderness in the neck nor did the jugular vein seem to be thrombosed. No ocular paralyses; no optic neuritis; no motor paralyses. The retinal veins of both eyes were paler than usual. There was slight general anæsthesia, but with no difference between the two sides. The knee jerk was normal. The patient complained of being unable to keep her eyes open, and she answered questions very slowly, although rationally. The amnesic aphasia was marked. She used the word "fan" indiscriminately, spoke of her physician as "Dr. Fan," asked for her "fan" when she meant her wrap, etc. She realized that she used the wrong word and manifested annoyance over what she called her stupidity in making such mistakes. She could not name the objects which were held before her, but she would correctly state the purpose for which each was used. Thus for example, while she seemed unable to call a key by its proper name, she stated correctly that it was something used for locking and unlocking a door; a pencil, something to write with; a watch, something to tell time by. The only exception was with money, the denomination of which she appeared to have no difficulty in correctly recognizing. The temperature was 103.5°, the pulse 108 and the respiration 24.

A diagnosis of mastoiditis and brain abscess was made, and it was believed that the latter would be found situated in the temporo-sphenoidal lobe and to involve the third and ascending frontal convolutions.

*Operation.* The patient was prepared in the usual manner, and a curvilinear incision behind the auricle was made, and was extended forward in such a manner as to expose the entire squamous plate of the temporal bone. Another incision was carried upward and backward from the summit of the curvilinear incision, toward the vertex of the skull. The mastoid cortex was found to be normal in appearance and of ivory-like hardness. When the antrum was opened a very foul-smelling discharge appeared, and the cavity itself, which was very large, was found to be filled with cholesteatomatous material. Bone necrosis extended downward to the tip, and sufficiently far backward to involve the wall of the sigmoid sinus. I exposed the latter for a distance of about one inch, and found it to be covered with foul-smelling pus and with granulations. The pus kept oozing out from the region under the antrum, and on exploration with a probe there was found a fistulous opening that led from the tegmen tympani for some distance into the cranial cavity. On the removal of the tegmen a tablespoonful of foul-smelling pus flowed out. The posterior superior wall of the external auditory canal was removed, the tympanic cavity was thoroughly curetted, and all granulations and remnants of necrotic ossicles were removed. The greater part of the squamous portion of the temporal bone, together with some of the anterior border of the parietal bone, was removed. The exposed dura was blackish in spots, and everywhere covered with lymph or bathed in pus. This extradural abscess was situated fairly far forward, and was spread out over that part of the dura which covered the temporo-sphenoidal lobe. At the same time it was walled off, by adhesive inflammation, from the healthy dura. It was at this point, where the tension of the dura was greater than normal, that I made an incision into the brain to a depth of about three-quarters of an

inch, in an upward and forward direction. The incision afforded escape to some disintergrated brain material and pus. Exploration revealed the fact that the abscess cavity was about the size of a walnut and was lined with a distinct membrane. *Syringing was not resorted to;* instead, the cavity was wiped out with pledgets of gauze. An annoying hæmorrhage occurred from one of the meningeal vessels. Sterile gauze packing was used. Sutures were employed for closing the upper portion of the wound. Firm pressure, by means of dressings and bandages, was applied. The operation lasted one hour and fifteen minutes, and was followed by little or no shock. The temperature after the operation was 98.4° F., pulse 106 and of good volume and strength. During convalescence the temperature never went above 100° F., nor below 98° F. For a period of about one week following the operation the patient was restless and, at times, nauseated, and she suffered somewhat from retention of urine.

On January 26th, the facial paralysis was found to be scarcely discernible. The aphasia had grown somewhat less noticeable, but the patient still complained of much headache. When the wound was dressed no irrigation was used; the cavity was simply wiped out with cotton pledgets soaked in a weak bichloride solution, and the wound was then packed with sterile gauze. The wound was dressed every other day.

On February 20th, it was found that the aphasia had entirely disappeared.

On March 7th, a small abscess developed in the anterior extremity of the wound. The patient was etherized and an incision was made over the point of fluctuation. A discharge of pus followed, and, on probing, a small point of necrosed bone was found. This was removed with a rongeur and curette. The patient was discharged from the hospital on March 21st. By the middle of April, twelve weeks after the operation, epidermization of the tympanic cavity had taken place, and the external wound had entirely healed. The patient's general condition, as she declared, had never been better.

My chief object in reporting the history of the present case is, not so much that I may furnish a fresh illustration of the successful results which are obtainable from fearless, yet rational, surgical skill, as that I may draw attention to and emphasize the fact that the organ of hearing receives far less consideration at the hands of the medical practitioner than does that of the scarcely more important organ of sight. It seems to me that it would be scarcely possible to find a more striking example of the dangerous and destructive complications that may arise from neglect of the proper treatment of a chronic purulent inflammation of the middle ear than that which is afforded by the case of which I have here, very briefly, given the history. And in this connection I beg to make the following quotation from that classical work on "Diseases of the Brain and Spinal Cord" by Dr. William MacEwen:—

"When the tympanic cavity has become the seat of chronic suppuration, with ulceration of the mucous membrane extending

into the antrum and mastoid cells, it becomes a standing menace to the safety of the patient. The disease progresses insidiously, and one cannot be certain as to when and where it may end. A person might as well have a charge of dynamite in the mastoid antrum and cells, as one cannot know the moment when accidental circumstances may arise which may cause the infective matter to become widely disseminated all over the cerebro-spinal sytem. Chronic otorrhœa is much too lightly regarded and is fequently considered as a mere inconvenience, instead as a menace to life. It is true that many affected with chronic purulent otitis media pass through a long life without suffering obtrusively from it, and may die from causes neither directly nor indirectly associated with it. On the other hand, the disease is one which advances insidiously, often without pain, until very extensive destruction of the middle ear and the mastoid antrum and cells, with thinning of their osseous walls, and serious invasion of the meninges, the blood vessels, and the brain itself, occurs. The mere localized suppuration, continuing for many years, is a source of weakness, tending to waxy or amyloid degeneration of the tissues. As long as the middle ear and its recesses are the seat of pus secretion they are liable to become a focus for pathogenic organisms, which may find their way into the general circulation, or by extension invade the meninges and the brain. From this very small focus the brain and cerebro-spinal meninges may become affected. One who has a chronic purulent otitis media is liable to have, with very little warning, a most serious or even fatal illness. Besides those who succumb to such diseases recognized during life, others do so from diseases directly or indirectly the result of chronic otitis media and its extensions, but which are registered under the heading of its prominent sequelæ—pneumonia, pleurisy, meningitis, *et cetera*. It is a fact that the records of most aural hospitals show that the patients are all confined to the earlier decades of life. This may be variously interpreted, but it is probable that many people *die* from such sequelæ before they reach forty years. Under these circumstances all persistent purulent discharges from the middle ear ought to be regarded seriously, and the medical attendant ought not to rest satisfied until the discharge is cured. If this cannot be accomplished after sufficient trial by the ordinary means at the disposal of the aurist, applied through the external auditory meatus or Eustachian tube, then recourse ought to be had to operative treatment, directed first to arresting encroachments of the disease toward the cerebral and cerebellar fossæ; secondly, to opening the various recesses of the mastoid process and removing therefrom diseased membrane, granulation

masses, cholesteatomatous débris and bone erosions contained therein; thirdly, to affording a free outlet to discharges which are otherwise pent up; and fourthly, to filling up these parts with fresh fibrous tissue, or to forming a permanent opening to the middle ear through the antrum."

These cases of which Dr. McEwan speaks ought seldom to occur. The simple fact of the occurrence of the disease *generally* means culpable neglect of an acute otitis media, for, if proper therapeutic measures are carried out in these primary inflammations, a secondary or chronic form of the disease will not follow. Of course, grave complications, such as mastoiditis, acute cerebral and cerebellar abscess, and septic sinus thrombosis may occur in the course of an acute inflammation of the middle ear, for the development of any of these complications is at times perfectly unavoidable, and may take place under the most careful and skillful treatment. When they develop, however, as a complication of the chronic form of purulent inflammation of the middle ear, their occurrence can no longer be termed "unavoidable." They should have been prevented. And this suggests the question, How may we prevent the acute form from lapsing into the chronic form? and, to go still further back, how may we prevent many cases of the acute diseases from arising?

Nearly all disease of the middle ear has its origin in some pathological change in the nares or naso-pharynx, through extension along the Eustachian tube or along the lymph channels of this tract. So here is the first point of attack. We should not let such pathological conditions pass without treatment.

Among the various nasal affections the one which plays the most important part in producing inflammation of the middle ear, especially in childhood, is indisputably, hypertrophy of the pharyngeal tonsil. Owing to this fact, I feel warranted in saying that every child born into this world should be examined a number of times, during its early life, for this hypertrophied condition, and when it is found to exist, either alone or associated with hypertrophy of the faucial tonsils, as is frequently the case, the mass should be removed, as should also the hypertrophied faucial tonsils. Children who have such a growth of adenoid tissue are much more prone than other children to contracting the exanthemata, tuberculosis, diphtheria, acute coryza, etc.—pathological processes which are accompanied by a purulent secretion in the nares or naso-pharynx. It is an easy and short passage for the bacteria to make their way from this point, along the Eustachian tube, to the middle ear, where, owing to the rigid surroundings of this small cavity, they may do much damage.

Again, if acute otitis media does arise in the presence of this growth in the vault of the pharynx, it is much more difficult to treat the attack successfully, for the mechanical obstruction presented by the latter interferes most seriously with the re-establishment of natural drainage and thus favors the development of chronic conditions of the middle ear. The mechanical interference referred to is brought about by this growth in two ways: first, by pressing on the pharyngeal opening of the Eustachian tube; and secondly, by the participation of the tubal mucous membrane in the same phenomena of congestion and swelling which are taking place in the enlarged tonsillar tissues.

To recapitulate, it is the physicians first duty to properly care for the pharyngeal and nasal cavities of his patients, especially in children, for by the adoption of this course he will materially diminish the frequency of attacks of acute otitis media. Secondly, he ought never to neglect a case of acute otitis media, but should at an early stage freely incise the membrana tympani in order to secure good drainage, and should effectively cleanse the parts at short intervals. Absolute rest should be enjoined and the intestinal tract should be kept freely open. It is by these measures, in the main, that we may expect to effect a cure. But if, after the lapse of a reasonable length of time (not more than four weeks at the longest), it is found that the inflammation still persists, the case should be put in the hands of an expert and not allowed to drift into a chronic condition, as it almost surely will if the criminally ignorant statement is made to the patient that he "will outgrow it in time."

Finally it should be made plain to the patient who is affected with a chronic discharge from the ear, that such a discharge points, in the majority of cases, to the existence of a diseased process in some part of the middle ear, and that the ultimate issue of this process is oftentimes death. On the other hand there has been accumulated during the past decade a mass of evidence which makes it no idle boast for the specialist to claim that nearly every one of these cases is curable, in some instances by skillful local measures, and in a still larger number by a suitable surgical operation.

# XLVII. THE EARLY DIAGNOSIS AND TREATMENT OF ACUTE MASTOID INFLAMMATION

By T. H. HALSTED, M. D.
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The middle ear is a long, tortuous, cartilaginous and bony tube or canal, lined throughout with mucous membrane, beginning at the naso-pharynx, extending through the narrow Eustachian tube to the dilated tympanic cavity, and continuing through a narrow bony passage to the antrum, where branch off a number of cells, honeycombing the mastoid process. The middle-ear, an air-containing sinus, is perfectly analogous to the accessory sinuses of the nose, and it simplifies very much the understanding of the pathology of acute otitis media if we regard the middle ear as an accessory sinus of the naso-pharynx and appreciate its three main divisions, viz., the Eustachian tube, tympanic cavity and mastoid cells. The tympanic cavity is divided into a lower part, the atrium, and an upper, the attic. The attic, to us the most important division, contains the head of the malleus and most of the incus and is frequently shut off from the rest of the cavity by folds and reduplications of mucous membrane. When these become swollen by inflammation the separation may be complete, the antrum and mastoid cells being shut off from receiving air, their normal contents, while the secretion of mucus and the products of inflammation are prevented partially or entirely, as the case may be, from passing out through the passage that connects the antrum with the attic and tympanic cavity. The antrum is the earliest developed mastoid cell; it is present at birth and is often the only one present until about the third year, at which time other cells begin to develop, radiating from it. It is a cell constantly found, varies much in size and somewhat in position, but it is located at the upper part of the mastoid posterior to and on a level above the greater part of the tympanic cavity, or rather, its floor is on a level, the patient in an upright position, with the attic with which it is continuous by means of the bony passage—the aditus ad antrum.

Beyond the antrum and connected with it at many points are a great many other cells, which go to make up the cells of the mastoid. These cells lie mostly below and external to the antrum, but often above and anterior to it over the superior wall of the external auditory canal. The antrum is then no more a part of the mastoid than it is of the tympanic cavity, and

partakes of inflammation of the latter, being as a matter of fact the connecting link between the tympanic cavity and the mastoid cells. The structure and size of these cells vary greatly in different subjects and no two mastoids are just alike—in some persons there being but the antrum and one other or a few other small cells, the rest of the bone being hard and sclerosed, while in other persons there may be any number of cells, the whole bone consisting of a thin cortex with a perfect network of cells filling up the rest of the bone. The relation of the antrum and the mastoid to the brain and other contiguous parts is, from a pathological and surgical point of view, most interesting and important. There is no other surgical region in the body confined within an area of a half inch in diameter where, in operating, one may strike so many different important structures, the injuring of any one of which might be so disastrous. The roof of the tympanic cavity and of the antrum, the tegmen tympani, is a plate of bone as thin, even in adults, as tissue paper, seldom thicker than writing paper, and in children and oftentimes in adults may be entirely wanting. The lateral sinus, one of the large venous sinuses of the brain, is located variously in relation to the mastoid and is often so far forward that it is wounded by the most careful and experienced operators in doing the ordinary mastoid operation. The horizontal semi-circular canal is very close to the deeper side of the antrum and the Fallopian canal, containing the facial nerve, winds about and is often involved in acute otitis media and may be easily wounded in operating. The goal in all mastoid operations is the antrum, because all extensions of inflammation have been from this point and all cells will drain into it unless prevented by granulation tissue, etc. Open the bone an eighth of an inch too far back and you may open full on the lateral sinus, an eighth of an inch too high and the middle cerebral fossa is entered, an eighth or a quarter of an inch too low and the facial nerve may be wounded with resulting facial paralysis; carry the chiselling too deeply in your search for pus, say three-fourths of an inch from the cortex, and you are in constant danger of going through the antrum, perhaps, not recognizing it, and into the horizontal semi-circular canal. Unfortunately, before operating, we cannot tell, in any individual case, just what the relation of the antrum is to these important contiguous structures.

This description of the middle ear has been given to emphasize the importance of an early diagnosis and an early proper treatment of acute otitis media and mastoiditis.

Acute otitis media is always present even in mild cases during the course of measles and scarlet fever, and is a very usual com-

plication of influenza and diphtheria, and may be the starting point and again the result of broncho-pneumonia, acute gastro-enteritis and other infectious or contagious diseases, as small-pox, syphilis and typhoid fever. It is, perhaps, the most common cause of meningitis, cerebral and cerebellar abscess, and there is no question whatever but that meningitis, the cause of death in so many infectious diseases, has resulted from an extension of inflammation and infection from the middle ear, which during life had not been recognized. Acute otitis media, catarrhal or suppurative, generally results from an infection derived from the naso-pharynx. I believe that in every case of suppuration of the middle ear the mastoid is always involved, the antrum certainly is. I cannot see how it can escape, but I can readily see how there may be no symptoms which point to mastoid involvement. Thirty children, dying from various complications of measles in Munich, were autopsied with special reference to their ears, and in every single case, without one exception, pus was found in the mastoid, and yet, in the great majority during life, the ears were not thought to be involved and many were not even examined. Given a case of acute otitis media, it is important to make an early diagnosis of mastoid inflammation in order that it may be promptly and properly treated, because of the serious results that may follow an unrecognized suppuration in this bone which is filled with air-cells that are lined with mucous membrane subject to great turgescence. This swelling dams back the secretion containing the bacilli that have entered and which find here an ideal place for growth and culture, having heat, moisture, and absence of air. The mucus secretion of the cells quickly becomes muco-purulent, and as the mucous membrane becomes destroyed the bone breaks down, granulations form and a bone abscess is established. It is important to make the diagnosis of mastoid involvement early, because of the great rapidity with which this bone disintegrates, and we have gone far toward the diagnosis if we admit the fact that the antrum always participates in every case of acute suppuration of the middle ear. If in acute suppuration of the tympanic cavity and antrum drainage be not quickly established through spontaneous or artificial perforation of the drum membrane the inflammation will extend to the various cells of the mastoid, first as a congestion, then as a catarrhal, and later suppurative inflammation of the lining mucous membrane.

The symptoms of acute otitis media are, perhaps, in the order of their occurrence, fulness in the ears, tinnitus, some degree of deafness, pain at first dull, then most acute and excruciating, and causing children to scream in paroxysms. With adults the

pain is more constant, steadily increases and prevents sleep. The pain is aggravated by blowing the nose, movements of the jaws as in eating and the most tender point at first is on deep pressure in front of the tragus. Infants and young children evidence the pain by putting the hand to the affected ear or side of the head. They are peevish, scream suddenly, waking from sleep, and are often thought to be teething or affected with worms. In a child the temperature is 101° to 104° F., with a pulse correspondingly rapid, vomiting may occur and not infrequently convulsions. A diagnosis of pneumonia, typhoid fever or meningitis may have been made and not changed until a discharge of pus is discovered from the child's ear, and with this an abatement of all symptoms and a clearing up of the diagnosis. In the same way, in the case of an adult, there is a rapid improvement of all symptoms coincident with the rupture of the drum, and the drainage of the tympanic cavity, temperature drops to almost if not quite normal, pain lessens, and the discharge at first serous, or muco-purulent, reaches its height of profuseness by the fifth to the seventh day, after which it begins to subside and terminates in ten days to three weeks, the drum healing, hearing improving and becoming normal in three to five weeks. This is the average course of uncomplicated though severe acute suppurative otitis media without symptoms that call especial attention to the mastoid. At the same time the mastoid was involved and was contributing its secretion to the discharge as seen at the outer ear. The reason that attention was not called to it was because spontaneous rupture of the drum occurred early, the perforation was large, there was no serious blocking of the passage leading to the antrum, and the drainage was free and good with no pressure of retained fluid to cause pain.

Let conditions be different and the symptoms change. If the drum does not rupture early the pus is retained in the tympanic cavity. Pain in the ear is greatly increased, temperature increases and an examination of the drum would show it to be greatly reddened and probably bulging. The bulging soon becomes greater and the pain is now referred not alone to the front of and in the ear, but back of the ear, and brought out especially by deep pressure of the finger over the antrum. Superficial pressure of the finger may elicit no pain or tenderness. The pain is brought out by deep pressure of the finger over the antrum or the tip of the mastoid, and it is a matter of common experience that it is often entirely overlooked by the attending physician who does not examine properly for it. A comparison of the two sides may assist, the finger of one hand on the affected mastoid, the finger of the other hand on the normal mastoid, and

the patient will quickly appreciate the difference in the two sides. The superior and posterior wall of the external auditory canal next the drum is reddened. This redness is early accompanied by swelling and bulging and may be so great as to occlude the canal and shut off a view of the drum, at the same time increasing the obstruction to the outflow of pus, should the drum rupture. This redness of the postero-superior wall of the external canal is characteristic and important because it is an early evidence of mastoid inflammation. By this time the drum will probably rupture and a discharge of pus occur in the external canal, but generally the perforation is not large enough to freely drain and the mastoid inflammation will continue to increase. The discharge may be very profuse, and yet with a continuance and an increase of pain over the whole mastoid, and especially on deep pressure over the antrum, and with this the swelling and redness of the postero-superior wall of the external auditory canal, we may be sure the mastoid inflammation is increasing. The pain settles down to a steady, heavy, dull pain referred not alone to the mastoid but to the whole of that side of the head. The mere gentle rubbing of the surface of the hair is painful. Temperature in adults is not high, running from 99° to 101° or 102° F., or it may be not above normal. In adults high temperature and chills are more frequently absent than present, contrary to what might, perhaps, be expected. These symptoms may all continue for weeks before the old so-called classical signs of mastoid inflammation—redness, heat, and swelling over the mastoid, occur. If the patient live long enough, and he often will, these symptoms will come on, but they are not early, they are very late signs of mastoid abscess, and while waiting for them the patient has suffered a great amount of pain, the bone is broken down and is destroyed and the patient has been in constant danger of meningitis or lateral sinus thrombosis. In adults, with old chronic suppuration of the middle ears, the mastoid is sclerosed, and if one waited in such a case for the abscess to reach the surface his operation would almost surely be upon the cadaver. In children, external swelling, redness and heat come on very early because here the inflammation is either a periostitis or the mastoid being very thin, perforation occurs very early. In children, too, the auricle is early seen pushed out and forward.

As swelling, both in children and adults, comes on the pain becomes less severe than it had been, and with perforation of the cortex and the periosteum the relief is very great. Of course, now there is fluctuation, but it may have taken six weeks to three months for this to occur. Swelling below the tip at the angle of

the jaw and down the side of the neck under the sterno-mastoid occurs in a percentage of cases, known as Bezold's mastoiditis. Here the extension of the disease has been through the digastric groove. It may happen that the discharge which had been profuse and without much pain diminishes or ceases, and with it an increase of pain occurs. This is always a danger signal meaning that the drainage from the antrum has ceased and calls for surgical intervention.

The nature of the infecting germ has everything to do with the severity of the inflammation and of the prognosis. Staphylococcus and pneumococcus infection are commonly altogether less severe than streptococcus. The presence of the latter in large quantities in the pus from the middle ear means a very probable destructive process in the mastoid. The bacillus of la grippe has a pronounced predilection for the middle ear. Suppurative otitis media and mastoid abscesses were, during the recent epidemic of last winter and spring, very frequent complications of that particular epidemic. The bacillus of influenza, as we can easily see its work in the nose, gives rise to a great amount of swelling of the mucous membrane, shutting off the ventilation of the accessory sinuses and producing very quickly a very profuse suppuration. As we see it in the nose, so it occurs in the middle ear, and we are not surprised at the rapid progress of the middle ear suppuration, the certain involvement of the mastoid and the probable abscess resulting from it. Influenza involving the mastoid is always severe and very destructive.

The treatment of acute mastoditis depends upon the stage of the inflammation and the cause of the middle ear infection. The mastoid being inflamed in every case of middle ear suppuration, the most important thing is to see that good drainage is afforded the tympanic cavity, and that is insured only by a free incision of the drum. Paracentesis is not enough. The drum should be freely incised under cocaine in adults, often under a general anæsthetic in children, making the incision in the posterior and inferior quadrant of the drum, extending it well up behind to the region of the attic should there be bulging there as in most severe cases there will be. The patient in bed, a brisk purge, attention to the naso-pharynx and free drainage through the drum, in the vast majority of cases of acute mastoiditis, the inflammation will at once begin to subside, mastoid pain diminishing and soon disappearing, the case terminating favorably with recourse to no further measures than keeping the drainage free. Syringing of the external canal with a hot boric acid or other mildly antiseptic solution may be all that is required, and this should be done only by one who has been

properly instructed and is capable of carrying out the instructions. The syringe should be one, such as the soft rubber bulb, that can be boiled and should be boiled both before and after each use of it. The objection to syringing in the hands of indiscriminate persons is that there is greater danger of introducing new infection than of removing any of the old, mixed infection resulting. Should the incision close or prove inefficient for good drainage another should be made without any hesitation or delay. If there be any unusual amount of swelling in the post-superior wall of the auditory canal a free incision extending from the margin of the drum outward and through the periosteum to the bone should be made, and to be of value should be made early. This incision is known among otologists as Wildes' Internal Incision in contradistinction to his famous incision made back of the auricle and which latter is now abandoned except in the case of children with periosteal abscess.

It is not an infrequent practice for physicians to insufflate powdered boric acid into the external auditory canal during acute suppuration of the middle ear. The practice is an absurd one and one full of danger to the patient as the powder acts as a dam to the drainage and is mentioned here only because many persons still follow this most unsurgical procedure. The introduction of gauze, for drainage, is in theory fine, but in practice not feasible because of the pain attending the frequent changing of the gauze.

As before stated, the treatment outlined will clear up a great majority of cases of acute mastoid inflammation and suppuration. Not all, however, and particularly those of the streptococcus and influenza variety. If the pain continue and tenderness on deep pressure over the mastoid be not allayed, ice applied by the aural ice-bag, or better still, cold through the Leiter coil should be used, and to be of value should be kept on continuously for twenty-four hours. If at the end of twenty-four hours the pain and tenderness have ceased the application can be discontinued, but if they are still present, the ice-bag or the coil should be renewed for twelve hours, and at the utmost twenty-four hours longer, in all for thirty-six to forty-eight hours from the beginning. The cold causes a contraction of the blood-vessels in the swollen mucous membrane lining the antrum and the cells, thereby lessening the swelling and giving the cells a chance to empty themselves of the dammed-up muco-pus and pus, and with no obstruction at the drum, the perforation being kept free, the majority of these cases, more severe than the first kind, will terminate in recovery without recourse to an opening of the mastoid. If at the end of thirty-six to forty-eight hours there is no

let up in the pain, the longer continuance of the ice will probably only increase the tendency to the death of the bone and so become harmful. The proper time for the use of ice is in the early stage of the inflammation and, if used at this time and used properly, it will exert such an influence on the inflammation that many cases which would appear to be going on to operation will recover without it. My experience is that cold is altogether perferable to heat, though some experienced otologists, notably Randall, prefer and make use of continued heat, and report results equally good with those using ice.

Much stress has been laid upon the symptom of pain, and for this reason morphia ought never, in this disease, to be given for its relief. It can have no other effect than to relieve and so entirely mask the one symptom that it is so important to properly gauge. So much depends here upon the pain that it is hazardous to both patient and physician to deliberately throw away the most important subjective and diagnostic symptom. If pain is so great that morphia seems required to relieve it, an operation is most urgently demanded. Phenacetine will not mask the pain, but will quiet the patient's restlessness.

If, after using the ice the pain on deep pressure over the antrum subside even slightly and the general tenderness diminish, discharge from the ear continuing freely, operation may be postponed. If, on the other hand, pain over the mastoid continues, increasing in severity and extending up the side of the head, a slight elevation of temperature persisting, sleeplessness, the swelling and redness of the postero-superior wall of the external canal not diminishing, but increasing, the mastoid under these circumstances should be opened. If the discharge which had been free should lessen, and at the same time pain increase, there should be no delay whatever in chiselling into the antrum. Should vomiting, nausea and dizziness supervene we have evidence of meningeal irritation and congestion which, unless quickly relieved by drainage from the antrum, will become a meningitis, and our operation may be late, but even with these symptoms, together with delirium, the mere mastoid operation without any attempt to enter the cranial cavity may be all that is necessary to save the patient's life. Without question a localized pachymeningitis is frequently present when the mastoid operation is done, and is recovered from as result of this operation. An extra dural abscess, the tegmen tympani having broken down, is not infrequently found to be present when the mastoid is opened, and it is often recovered from free drainage occurring as a result of the mastoid opening.

The goal in all mastoid operations is the antrum, and this

should always be first found and entered, and is done by means of the chisel, hammer, rongeur forceps and spoon. In recent cases it may be sufficient to merely drain the antrum. but ordinarily there has been quite a destruction of the bone and all the soft bone, granulation tissue, etc., should be removed, and this will often mean the removal of the whole cortex and all mastoid cells extending down to the tip, at which place there is generally a large cell, and it will often occur that the only pus found will be in this most dependent cell, and it is important that exit be afforded it.

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## XLVIII. RESUMÉ OF THE SUBJECT OF ACTINOMYCOSIS, WITH REPORT OF A CASE OF ACTINOMYCOSIS ABDOMINALIS

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In presenting this paper I desire to express my appreciation of the work done by my associate, Dr. Elting, who has contributed so much in the careful study of the subject, which will be noted by the reference made to the various authors, French and German especially.

Actinomycosis is an infectious disease common to man and many of the domestic animals, caused by a polymorphous fungus belonging to the genus of oöspores. The fungus was first recognized by von Langenbeck in 1845 in a curious disease of the lumbar vertebræ of a man. Lebert in 1857 described in detail a case of thoracic actinomycosis observed by Louis in 1848, and in his atlas published excellent cuts of the actinomyces. Lebert, however, believed these fungi to be the débris of cysticerci. In the years from 1868 to 1875 the so-called sarcomata of the jaws of cattle were carefully studied by Rivolta and Perroncito and shown to be due to the actinomyces. At about the same time Bollinger began the study of "Lump Jaw" in cattle and recognized the characteristic fungus which he referred to the botanist Harz, who classified it and gave to it the name of actinomyces.

The first important appearance of actinomycosis in human pathology dates from the work of Israel, published in 1878. The identity of the bovine and human actinomyces was at first disputed, but the researches of Israel and Ponfick appear to have

settled the question in the affirmative, even before the transmissibility of the disease from man to animals, and *vice versa*, had been proved by inoculation experiments.

The early attempts at inoculation were unsuccessful, but in 1880 Johne succeeded in producing the disease in a cow by inoculating some of the actinomycotic granules obtained from another animal of the same species. Similar experiments upon others of the domestic animals were successful, and in 1883 Israel first successfully inoculated the human actinomyces into a rabbit.

From 1880 to 1890 the new disease was studied with great care in Germany, both from the etiological and pathological standpoints. The clinical features of the infection also began to attract attention and a variety of clinical forms were distinguished. During that decade two articles were published which deserve especial attention: (1.) the classical monograph of Israel, which appeared in 1885, and which included a report of thirty-seven cases of human actinomycosis and presented a study of the disease to which comparatively little has been added since; (2.) the monograph of Böstrom, in which the subject of human actinomycosis was most carefully considered and especial attention paid to the transmissibility of the disease by means of vegetable life.

During the past decade much interest has been aroused in the disease in France, as evidenced by the numerous excellent publications upon the subject and especially the exhaustive monograph by Poncet and Berard.

In America the disease has progressively attracted more attention until to-day the American literature upon the subject is quite extensive and the disease is no longer regarded as of extremely infrequent occurrence.

There has been, and still is, more or less difference of opinion as to the exact botanical classification of the actinomyces, resulting largely from the marked pleomorphism manifested by the microörganism, as well as its capacity for the infection of a great variety of animals. The above fact is evidenced by the great variety of names that have been proposed for the fungus as Bacterium actinocladothrix by Affanasjeff, nocardia actinomyces by Terni and Trevisan, streptothrix actinomyces by Doria, nocardia bovis by Blanchard. The true distinction between actinomycosis—Madura foot—and the group of pseudo-actinomycoses, was first clearly established by Blanchard in 1895.

In the infected tissue, the contents of abscess cavities or the discharge from fistulous passages, one usually finds the actinomyces present in the form of small, yellowish, more or less opaque granules, varying in size from .15 to .75 millimeters, although

larger granules often occur. In their earliest stage the granules are usually grayish white, transparent, and are easily broken up, the consistency being that of a soft jelly. As the granule grows older it tends to become more opaque and more yellow, and finally it may become impregnated with calcium salts, giving rise to a structureless concretion. This gradual transformation of the granule is the result of the metamorphosis of its constituent elements. In the early stages the granules are composed of homogeneous fine threads which later on become thicker and at their ends present bulbous swellings. Gradually the threads assume a more and more compact and intricate arrangement and the bulbous swellings are arranged radially about the periphery of the granule. The mycelium usually appears as a bacillus from 3-6$\mu$ in length, arranged in threads with numerous branches. These threads frequently stain very irregularly and often present somewhat of a streptococcus appearance. Böstrom and most observers regard these coccus forms as spores. The bulbous swellings often seen about the periphery of the granules are now regarded as a product of degeneration of the mycelium.

The actinomyces stain readily with the ordinary basic aniline dyes and are not decolorized by Gram's method, while the bulbous swellings, already referred to, stain only with acid dyes. This change in the staining properties of the bulbs is evidently the result of the degenerative process through which they are developed.

The actinomyces is a facultative anaërobe and grows upon most of the ordinary bacteriological media. The most favorable temperature is from 33° to 37° C., and even under these conditions development of the cultures is usually slow, requiring from five to fifteen days. Very often the actinomyces are mixed with some other microörganism, the growth of which is more vigorous, and tends to obscure the actinomyces. The microörganisms most commonly found in association with the actinomyces, have been the staphylococci, the streptococci, the colon bacillus, and the leptothrix buccalis. There also appears to be an antagonism between the actinomyces and the associated microörganisms as a result of which the virulence is often rapidly attenuated. The actinomyces also possess a surprising ability to develop upon cereals, as well as upon vegetable media in general. The growth of the fungus is arrested by a temperature of 45° C., and at 60° C. it is rapidly destroyed. The spores are more resistent to injurious agencies than is the mycelium although less so than the spores of bacteria. An interesting fact is the greater resistance to noxious agencies possessed by the spores, when grown

upon cereals. Experiments by Berard and Nicolas have shown that the spores have lived as long as four years upon certain cereals and under unfavorable conditions. The actinomyces does not appear to produce any active toxine in the cultures.

Positive results following inoculation experiments have been somewhat uncertain, both with the cultures as well as with the direct products of the lesion. In the majority of instances these experiments have been failures, although Ponfick, Hanau, Wolff, Israel, Johne and Böstrom have reported positive results. There are a few cases on record in which it seems probable that man has contracted the disease from animals, but it would appear that prolonged, intimate and close contact is necessary to produce an infection. All this seems to indicate that the virulence and infectiousness of the actinomyces are diminished in the animal organism.

The consensus of opinion is that the great carriers of the actinomycotic contagion are the different forms of cereals, especially barley, and it is mainly through their agency that man and the domestic animals become infected. In certain cases pieces of cereal grains have been found in the focus of infection and the history of the case has been such as to point almost definitely to their being the source of infection. Vegetables—especially those grown above the ground—may also convey the contagion to both man and animals.

Men are much more frequently affected than women, probably as a result of their being more exposed to infection. Of 357 cases of human actinomycosis collected by Hutyra one-third occurred in the third decade.

Five chief avenues of infection have been distinguished: (1.) through the mouth and pharynx; (2.) through the respiratory tract; (3.) through the gastro-intestinal tract; (4.) through the skin, wounds, etc., and (5.) a group of cases, in which no definite portal of entry is discoverable.

The debut of an actinomycotic lesion is accompanied by a more or less marked phagocytosis, the cells being of both an epithelioid and a leucocytic character. Should the protective activity of these cells gain the upper hand the lesion will be a slight and insignificant one. The process, however, usually extends and the degeneration of the tissue, together with the accumulation of leucocytes, may give rise to a sero-purulent focus and this without the intervention of any secondary infection. This product of necrobiosis is, however, to be distinguished from pus in the stricter sense of the word.

Microscopically a focus of actinomycotic infection is characterized by a central zone containing the fungus either free or

Fig. 1.

attached to the foreign body by means of which it gained access to the part. In this zone there are more or less cellular detritus and products of degeneration. Next comes a zone characterized by the presence of round cells and epithelioid cells, the degeneration of which supplies the detritus already alluded to. The outermost zone of the actinomycotic focus is characterized by a more or less extensive area of granulation tissue. As in any chronic inflammatory process so in an actinomycotic focus giant cells are often seen. The blood-vessels in the immediate vicinity of the focus are but rarely obliterated.

All the actinomycotic lesions can be divided into two great classes: (1.) the neoplastic type, which is the one usually found in horses and cattle, and (2.) the inflammatory type, which is the one usually found in man and hogs.

The neoplastic type of lesion usually occurs in very vascular tissues which are capable of an intense reaction and which often result in the production of a fairly-well defined indurated area clinically resembling sarcoma. The neoplastic type represents an attenuated form of the disease which does not possess marked invasive properties and is the form in which spontaneous recovery not infrequently occurs. The granulation tissue tumor representing nature's method of overcoming the infection.

In the inflammatory type the process of destruction exceeds in rapidity and intensity that of defense. The process tends to extend through the connective tissues and avoids, so far as possible, parenchymatous tissue, in which opposition to extension seems to be more vigorous. The inflammatory type tends to the production of sinuses, but does not tend to the development of large abscess cavities which are usually the result of a secondary infection. The rapidity of development, as well as the nature of the lesion, depend more upon the differences in resistance manifested by the tissues than upon the initial virulence of the parasite. The muscles are not favorable sites for the development of actinomycotic foci, probably because of the small amount of connective tissue present. The bones, too, afford a very unfavorable medium for the development or extension of the process.

The tendency to the formation of fistulous passages is quite characteristic. The discharge from these fistulæ may present marked differences. In some instances it is serous, in others sero-purulent, and in still others distinctly purulent. The discharge usually contains the actinomycotic granules in varying number. If the case has existed a considerable period of time, and shows evidence of improvement, it may be difficult to find the characteristic granules. In fistulous cases secondary infection practically always exists.

Another of the characteristic features of actinomycotic lesions is the tendency to extend by continuity, rather than by metastasis. Metastasis does, however, often occur and usually takes place through the blood channels. Metastasis through the lymphatic channels is of very rare occurrence and involvement of the regional lymphatic glands is also rare unless secondary infection has supervened.

Poncet and Berard propose a division of actinomycotic infection into the following groups: (1.) cervico-facial; (2.) thoracic; (3.) abdominal; (4.) cutaneous. Foci in bone—the spinal column,—the genito-urinary organs, the brain, special organs of sense, etc., are regarded as complications.

From a considerable number of statistics it would appear that about fifty-five per cent. of the cases were of the cervico-facial type; about twenty per cent. of the thoracic and pulmonary type; about twenty per cent. of the abdominal type, and about five per cent. of a variety of types.

In the abdomen actinomycosis involves primarily only a single group of organs, *i. e.*, the gastro-intestinal tract. There has never been a definitely authenticated case of primary abdominal actinomycosis reported which had not originated from the gastro-intestinal tract. There is no microörganism which can cause such extensive destruction of the abdominal viscera as the actinomyces. This results partly from the slow extension of the process allowing the formation of extensive adhesions, and partly from the opportunities afforded for the development of a secondary infection. Adhesions and abscesses then are the characteristic features of abdominal actinomycosis, the abscesses always resulting from a secondary infection.

The actinomyces gains access to the stomach along with the food, either animal or vegetable—most commonly the latter. Neither the gastric juice nor the bile appear to have any very decidedly harmful effect upon the fungus. The different portions of the alimentary tract seem to be affected in direct proportion to the length of time which the intestinal contents remain in the different parts. For the development of an actinomycotic focus it would seem necessary to assume the existence of some lesion, however slight, of the mucosa. Once having penetrated the mucosa, two modes of progression of the fungus are possible, first, a superficial involvement of the mucosa or, secondly, a penetration into the deeper structures without leaving behind any demonstrable defect of the mucosa. The latter mode of progression explains why with the extensive involvement of the abdominal viscera it is not infrequently impossible to locate the portal of entry.

Intestinal actinomycosis appears first as a small nodule in the submucosa which undergoes degeneration at its centre, and presently gives rise to a small ulcer with undermined edges which may extend either by progression or by confluence of several small ulcers. The base of the ulcer presents a granulating surface, dotted with the characteristic granules, and the mucosa about the ulcer is reddened. In certain instances the ulcers heal leaving irregular pigmented scars. It is very rarely that these early lesions are seen, and they have been best described by Chiari. As the process extends there is a decided tendency for the involved portion of the intestine to become adherent to other portions of the intestine, the abdominal viscera or the abdominal wall. The extensive and widespread adhesions prevent, in most instances, a perforation into the general peritoneal cavity. When the process originates from the colon, *i. e.*, from a portion of the intestine not provided with a mesentery, a retroperitoneal abscess is not an uncommon complication. This involvement of the retroperitoneal tissues may extend from the cul-de-sac of Douglas to the diaphragm, denuding the vertrebral column, attacking the kidneys, liver and other viscera, and in some instances extending even through the diaphragm into the pleural cavity. The usual outlet in such cases is either through the ischio-rectal fossa or the pleural cavity into the intercostal spaces or a bronchus. Most peri-anal actinomycotic fistulæ are of this origin.

If the process originates from the small intestine cæcum or appendix the tendency is for the disease to attack the anterior abdominal wall, which is by no means an uncommon event in the course of the disease. When the anterior abdominal wall is attacked there is a marked reaction in the subperitoneal tissue which undergoes a decided thickening. The muscles are invaded, become markedly degenerated, and eventually present more or less extensive areas of necrosis and suppuration. As the process approaches the surface the abdominal walls assume a board-like character, the skin becoming livid, ulcerates and sinuses are formed, the discharge from which contains the actinomycotic granules. These cases invariably present a secondary infection, and a great variety of microörganisms may be found, the colon bacillus, however, being one of the most constant. The process may also extend beneath Poupart's ligament into the thigh or may involve the hip-joint. Occasionally a perforation of one loop of intestine into another occurs, and in some instances the intestine adherent to the abdominal wall has perforated externally, forming a fecal fistula. Perforation into the bladder is of very rare occurrence, although cases have been reported by Böstrom, Hesse, Billroth and others. The prostate has, in a few

instances, been involved by extension of the disease from the rectum. In women the pelvic viscera have sometimes been extensively involved by extension of the process from the primary intestinal focus.

Another method of extension of the disease in the abdominal cavity is by metastasis through the blood current. In all the literature Grill was unable to find a singly authentic case in which abdominal actinomycosis had extended through the lymphatic channels. In all cases where an enlargement of the regional lymphatic glands has occurred, it has been found to be due to a secondary infection. Metastasis, in the great majority of cases, takes place through the veins rather than the arteries, and in the abdominal cavity it usually occurs along the course of the portal vein.

Among the secondary lesions of abdominal actinomycosis those of the liver are the most frequent. The preponderance of evidence seems to favor the assumption that practically all actinomycotic foci of the liver are secondary to some other focus in the body and that the liver is involved either by continuity, contiguity or metastasis. In twenty of the thirty cases of hepatic actinomycosis collected by Aribaud the primary focus was intestinal. In eight of these twenty cases the liver was involved by contiguity and in twelve by metastasis. When resulting from metastasis the hepatic foci are deeper, more numerous, smaller and have more of a tendency to suppuration. The kidney and spleen are but rarely involved either by contiguity or metastasis.

In from fifty to sixty per cent. of the cases of abdominal actinomycosis the primary focus is in the cæcum, appendix or contiguous portions of the ilium and colon, *i. e.*, in the right iliac fossa. In from ten to fifteen per cent. of the cases the primary focus is in the rectum. Primary foci in the stomach are exceedingly rare, the most authentic of this variety being those of Israel and Grill. In comparatively few cases has the primary focus occurred in the small intestine. There thus remain a certain number of cases of abdominal actinomycosis in which the primary focus is undertermined even though careful post-mortem examinations have been made. Furthermore, the possibility of involvement of the abdomen either by extension or metastasis from the thorax, must be borne in mind.

Grill has distinguished three typical periods in the course of abdominal actinomycosis: (1.) the initial period; (2.) the period of tumor formation; (3.) the period of fistula. To these three periods Hinglais has added a fourth—a period of repair. Although in certain cases this or that period may predominate or be

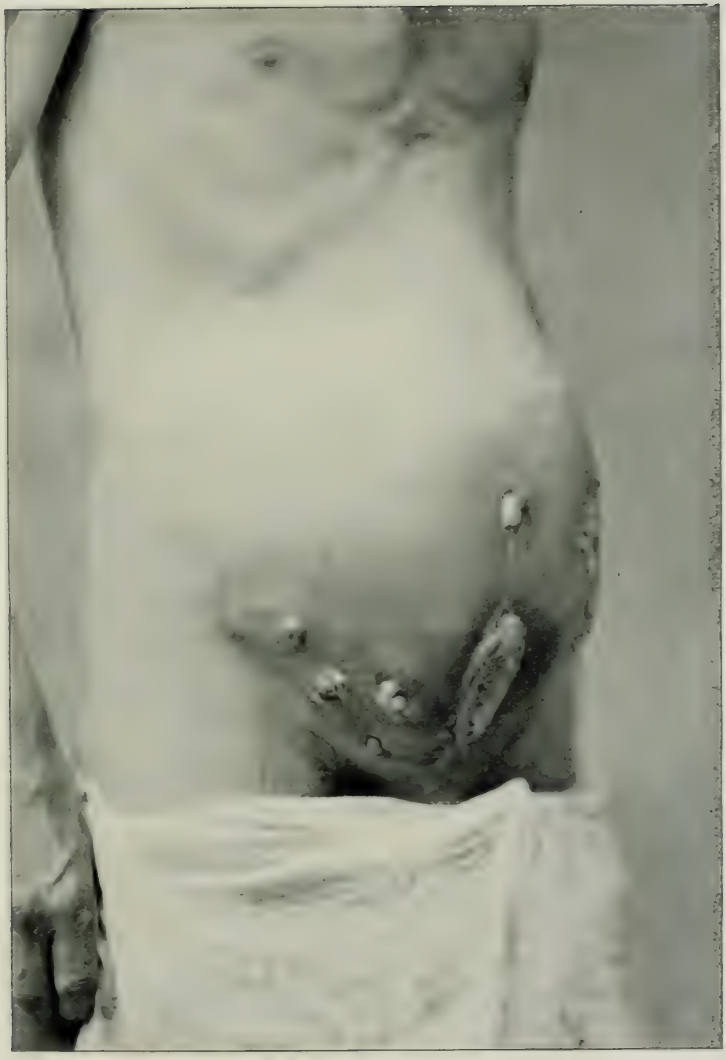

Fig. 2.

entirely absent, nevertheless, the periods mentioned are usually characteristic of the disease, when localized in the abdomen.

I. *The initial period.* In many cases the onset is fairly sudden and manifests itself by a catarrhal disturbance of the intestine, associated at times with diarrhœa and vomiting, and at times with constipation. In certain cases the early symptoms closely simulate recurrent appendicitis. The duration of the initial symptoms is very variable. They may last for weeks or months, or may pass rapidly into the period of tumor. Peritoneal symptoms are uncommon in the early stages of the disease. There are also a certain number of cases in which no initial symptoms occur and in which the *second,* or period of tumor, is the first manifestation of the disease. This in most cases is the first striking symptom. The tumor may present in a variety of places, usually, however, in the right iliac or umbilical regions. The extent of the tumefaction is very variable. In some cases a considerable portion of the abdominal wall is involved, while in others the tumor is limited to a small area. The outline of the tumor is usually indefinite, indistinct and irregular. Pain, while usually present, is rarely severe, and is rather a sensation of tension and discomfort. The tumor may remain stationary for a considerable period of time, but softening is apt to begin at the centre and gradually makes its way to the surface, the skin over the tumor becoming reddened, often livid, and one is surprised to find that such a condition, suggesting phlegmon, is rarely accompanied by much discomfort or febrile reaction.

This process leads directly to the period of fistula, for but rarely do the lesions show a tendency to recover spontaneously at the end of the second period. Associated with the formation of fistulæ the surrounding skin assumes a bluish-violet tint, which changes to almost a slate color as one passes from the centre toward the periphery of the involved area, and which, according to Volkmann, Böstrom and Bernhardt is sufficiently characteristic to allow a diagnosis of actinomycosis. Once begun the process of softening usually progresses rapidly and multiple fistulous tracts are developed. The character of the discharge varies with the nature of the secondary infection. In some cases it is a grayish serous fluid with a marked fecal odor—in other cases the fluid is of a clear serous character and is inodorous. While in still others it may be distinctly purulent. In rectal actinomycosis the fistulæ usually open about the anus and occasionally in the loin or above the pubis. Spontaneous recovery is possible even though there is an extensive infiltration of the abdominal wall with numerous fistulæ. This leads up to the period of

cicatrization in which the tumefaction gradually lessens, the discharge ceases and the fistulæ slowly close, leaving, finally, nothing but irregular areas of pigmented scars. The duration of the disease is quite variable from a few weeks to several years.

The prognosis in cases of abdominal actinomycosis, even though the process may be an extensive one, is not necessarily hopeless, for there are on record a considerable number of cases that have recovered. In general one can say that those cases offer the best prognosis which are most amenable to surgical treatment, and it is for this reason that the prognosis is more favorable in the abdominal form than in the thoracic. The tendency to recurrence must, however, be borne in mind and this appears to be of more frequent occurrence than in the other forms of actinomycosis. The oldest cases are the most unfavorable because of the possibilities offered by them for extension or metastasis. In seventy-seven cases of abdominal actinomycosis treated surgically Grill found twenty-two recoveries, ten improvements and forty-five deaths.

It is practically impossible to recognize the abdominal form of actinomycosis in its earliest stage, although the examination of the fecal matter has, in a few instances, led to a comparatively early diagnosis. In the later stages, when tumefaction is extensive, with foci of suppuration and numerous fistulæ, the discharge from which contains the characteristic granules, the diagnosis is comparatively easy. In the right iliac fossa it most closely resembles appendicitis, although there are less pain, less febrile disturbance and more of a tendency to extension of the process than is ordinarily seen in subacute or chronic appendicitis. Sarcoma, carcinoma and tuberculosis of the cæcal region must also be considered in differential diagnosis.

The question of prophylaxis is an unsatisfactory one because of the difficulty of preventing the ingress of the actinomyces into the body. Vegetable contagion being, in all probability, the great source of human actinomycosis, greater care in the selection and preparation of cereals and vegetables would certainly diminish the number of infections by this avenue. Since thorough cooking destroys the spores of the actinomyces in flesh, prevention of infection from this source would appear to be comparatively easy.

Therapeutically a so-called specific for actinomycosis has never been discovered. There exists in certain quarters an idea that potassium iodide possesses certain of the qualities of a specific in this infection. This has resulted chiefly from the work of certain veterinarians and particularly the work of Thomassen, of Utrecht, who, in 1885, expressed such a sentiment as the result

Fig. 3.

of the favorable action of the iodide in certain cases of actinomycotic glossitis. Certain it is that a considerable percentage of the cases in human beings have been benefited by a prolonged course of iodide of potassium and some of them definitely cured. It is necessary to administer the iodide in large doses, beginning with half a drachm and gradually increasing until from two to four drachms are taken in twenty-four hours. Rydgier recommends the injection of one per cent. solution of potassium iodide into the tissues involved. Poncet and Berard express the belief that in the treatment of the majority of cases of visceral actinomycosis, potassium iodide is not of great value, especially in the latter stages, when secondary infection has occurred. In general, potassium iodide appears to act more satisfactorily and effectually the earlier in the course of the disease it is administered. Experiments have shown that the iodide has little or no effect upon the growth of the actinomyces or artificial media.

Various observers have tried the effect of tuberculin upon the actinomycotic process, and in a few instances reported by Billroth, Kahler and others, improvement seems to have followed its use. An interesting and important fact brought out by Kahler, Illich and Wolff, and confirmed by Arloing, is that men and animals infected with actinomycosis react to Koch's tuberculin just as men and animals with tuberculosis do.

Ziegler has reported a favorable result in a case of actinomycosis following the injection of the protein obtained from cultures of the staphylococcus pyogenes aureus. Gautier has seen favorable results follow the use of electrolysis, and Braum recommends highly the use of Fowler's solution and other preparations of arsenic. In general, however, combined medical and surgical treatment would appear to have produced the best results, and especially is this true in the forms of actinomycosis more superficially placed.

The surgical treatment of all cases amenable to operation should be practiced combined with large doses of potassium iodide. In the abdominal and visceral lesions it is frequently difficult to determine the extent of the process and consequently the extent of the surgical intervention required. Careful exploration of the fistulæ and foci should be practiced, so far as possible, with the removal of as much of the diseased tissues as possible. If apparent recovery should occur the case should, nevertheless, be watched for several years because of the great possibility of recurrence.

Mr. A. S., Castleton, N. Y., aet. 45; native of United States; occupation, carpenter; married. Admitted to Albany Hospital February 22, 1901. Diagnosis, actinomycosis abdominalis. Treatment, operation and medical.

*Family history:* Father died of typhoid fever, aet. 74; mother aet. 98; one sister of enlargement of liver; five brothers and three sisters alive and well.

*Previous history:* Patient had usual diseases of childhood. Had typhoid fever at fifteen and was quite ill, but recovered completely. No history of any other diseases. Denies venereal disease of any kind. Has drank but little of stimulants. Smokes and chews tobacco rather excessively. Has not been associated much with animals; never worked in grain. General health has always been good. No cough, shortness of breath, bowel or bladder trouble. Never had any serious injuries.

Present illness began November 27, 1900, previous to which time patient had been perfectly well. Trouble began with pain in stomach, while at work, but finished day's duty and then took various remedies without relief. Had sharp cramps, chiefly in lower part of abdomen, very severe, lasting from three to five minutes, and recurring at first every half hour or so. Physician sent for next morning, but patient did not obtain relief from pain for a week. Pain then gradually diminished, but eight weeks elapsed before it entirely disappeared. No chill, fever or vomiting; slight nausea. Pain did not tend to become localized nor to radiate. Seemed to patient it was in bowels. No jaundice. Abdomen never distended, so far as patient knows. Bowels moved regularly; urination was normal. About the first of January, 1901, he was able to be up, around and improved quite rapidly. About the middle of January he went to work superintending an ice gang. Improvement continued, and by February 1st the patient stated he was as well as ever, having regained all the flesh he had lost. February 20th, while still feeling perfectly well, the patient noticed a small tumor in region of umbilicus, for which, February 22nd, he came to the Albany Hospital, under my care.

*Physical diagnosis:* There was a distinct tumor mass, size of a fist, in right iliac region, and a small tumor, inflammatory in character and evidently containing pus, at umbilicus. Smaller masses could be felt through and in the abdominal wall giving one an impression of sarcoma of the mesentery. Heart and lungs normal; liver dullness extends downward about one finger's breadth below costal margin; spleen and stomach normal. For past five days the skin over tumor has been red with yellow spot in centre. Urine amber, 1030, acid, no albumin, no sugar, sediment slight and a very large number of calcium oxalate crystals present. Blood examination revealed leucocytes 18,500, reds 4,710,000.

Operation February 28, 1901. Abdominal incision in median line six centimeters long. Upon opening the peritoneal cavity the peritoneum was found in various places adherent to coils of small intestine, and a flattened tumor, about the size of half of one's hand, springing from the right iliac crest, other adhesions extending up to the umbilicus. The case was thought to be a multiple form of sarcoma of the mesentery, yet presented a very different appearance from any similar case I have ever seen. It was now observed that there was a distinct hardening over this portion of the peritoneum, extending to the umbilicus, along the course of the urachus, and round ligament of the liver, with an abscess evidently presenting just under the skin. The latter was not opened for fear of infecting the peri-

toneum. Incision in peritoneum closed with fine silk, continuous suture; wound then closed with interrupted silkworm gut sutures and iodoform gauze introduced in lower end of incision, then standard dressing. Iodoform gauze removed on fourth day and drainage encouraged thereafter, the abscess of the umbilicus having opened and discharged a creamy, flaky-like substance. Specimens of discharge and tumor were saved, but lost later, not reaching the laboratory for examination. The patient was put upon syrup of hydriotic acid, strychnia and elixir of calisaya, and as good nourishment as possible.

Not feeling at all certain as to my diagnosis, and as to the possibility of actinomycosis, about April 1st, I asked Dr. Elting to look the case carefully over, and to make a thorough examination of the discharge.

His report is as follows:

Patient a large framed, much emaciated man. Skin and mucous membranes pale. Tongue clean. Conjunctivæ clear. Pulse 80 to the minute and regular in rate and rhythm. Wall of artery palpable. Heart normal on percussion and auscultation; lungs normal on percussion and auscultation. Abdomen somewhat distended, fairly uniform. Costal and iliac grooves obliterated. Respiratory movements present above level of umbilicus. In median line of abdomen midway between umbilicus and symphysis pubes, is a discharging wound five centimeters in length, which appears to be confined to the abdominal wall. Over an area which surrounds the umbilicus, and extends from a point five centimeters to the right of the median line to the left lateral abdominal margin, and on the left from a point four centimeters below the left costal margin to the level of the line joining the anterior superior iliac spine, the abdomen presents a marked board-like hardness over a considerable extent of which the skin is much reddened. This condition appears to be due to an extensive infiltration of the abdominal wall. In the right iliac fossa there is a distinct mass to be felt which extends from a point two centimeters above the line joining the anterior superior iliac crests to the right Poupart's ligament. This mass is very hard but not tender and appears to be connected with the abdominal wall. On deep palpation a projection from the mass appears to extend upward and inward toward the umbilicus. On percussion the note over the mass in the right iliac fossa is decidedly dull, while over the indurated area of the left abdominal wall the note is tympanitic. The liver dullness begins at the sixth rib in mammillary line and extends to the costal margin. Edge is not palpable. Spleen is not enlarged. Patella tendon reflexes normal.

On incision of the abscess in the region of the umbilicus about two ounces of purulent material escaped which contained numerous yellowish-white fine granules, examination of which showed typical actinomyces. In the tissue lining of the abscess cavity similar granules were visible. Cover slip stained by Gram's method showed the characteristic fungi. Culture from several of the abscesses showed so vigorous a growth of the bacillus coli communis that the growth of the actinomyces was obscured.

Patient was administered iodide of potassium in increasing doses, *i. e.*, a saturated solution commencing with three drops before each meal, in a wineglassful of water, increasing three drops each day until sixty drops was reached, and this dose continued.

May 1st. Condition has improved somewhat, although it has been necessary on two occasions to open abscesses in the abdominal wall. The pus excavated was of a yellowish creamy character and contained less numerous actinomycotic granules than before the administration of the iodide of potassium was begun. There is still a large tumor mass in the lower right quadrant of the abdomen, associated with extensive induration and infiltration of the abdominal wall, which presents four fistulous openings.

June 15th. Patient's general condition is not quite as satisfactory as on previous note. There is still an extensive induration and infiltration of the abdominal wall, which occupies practically the entire anterior wall, below the level of the umbilicus, and extends in the left side as far as the costal margin. The tumor in the right iliac fossa is practically unchanged, irregular in outline and of fine consistence. There are three discharging sinuses in the abdominal wall, one of the umbilicus, one in the median line, midway between the umbilicus and the symphysis, and one to the left of the median line. The discharge from these sinuses is of a sero-purulent character and contains a moderate number of actinomycotic granules. Appetite good, no gastro-intestinal symptoms. At patient's request he was discharged from the hospital and advised to continue with large doses of iodide of potassium.

June 29th. Patient re-admitted to the hospital for further observation. General condition is somewhat improved, although the abdominal condition does not appear to have changed materially, except that there are more discharging sinuses than at time of last note. The condition at this time is indicated by the accompanying photographs. (Figs. 1 and 2.)

The abdominal wall presents a board-like induration which extends in the left side from Poupart's ligament to the left costal margin and as far as the left lateral abdominal margin. The right lower quadrant of the abdomen presents the same board-like induration and the tumor in the right iliac fossa is practically unchanged. The skin over the indurated area is of a bluish-red color, and scattered over this area are no less than ten fistulous openings, the discharge from which is of a sero-purulent character and contains a moderate number of actinomycotic granules. Spleen, liver and kidneys are normal. Potassium iodide continued in drachm doses three times a day.

August 20th. Patient returned feeling much better than when seen about three weeks ago. The condition of the abdomen is distinctly improved. Some of the sinuses have closed and the discharge from the remaining is decidedly less. The infiltration of the abdominal wall is less extensive and the mass in the right iliac fossa is gradually disappearing. Patient has gained gradually in weight, which to-day is 130 pounds, as compared with ninety pounds, his weight in the early spring. The abdomen is not tender and the discharge of a sero-purulent character and containing but comparatively few granules, which still show the typical actinomyces. The liver is normal, as are the other abdominal viscera, the intestinal tract excepted. Heart and lungs normal. No enlargement of the lymphatic glands. Patient says that about two weeks ago a small pimple or blackhead developed on the right side of the nose, near the inner angle of the right eye. This was squeezed by his wife, who has attended to the abdominal wounds. About forty-eight hours after the pimple was squeezed the patient noticed

Fig. 4.

sium. The infection of the nose and rapid recovery all aid in confirming the previous diagnosis.

The photographs illustrate very nicely the appearance of the patient when improvement had commenced and still later on when in a condition of convalescence.

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## XLIX. METHODS OF INCISING, SEARCHING AND SUTURING THE KIDNEY

By HOWARD A. KELLY, M. D.
BALTIMORE, MD.

My studies for some years past, in operating upon numerous patients who have come to me with renal disease, have demonstrated the extreme importance of a more thorough knowledge of the anatomy of the kidney itself; and, having arrived at some definite conclusions upon this head, I take pleasure in presenting certain facts before you for the first time in a public address. I shall confine my attention to-day to the methods of incising, searching and suturing the kidney where calculus is believed to be present.

The diagnosis of stone in the kidney has fortunately been so greatly simplified by the use of the X-rays that with this agent we can now determine the presence or absence of stone in all cases with practical certainty. I recently delivered an address upon this subject before the American Gynecological Society in Chicago, in which I brought together a series of cases in which I had determined the presence of stone in the kidney by passing a bougie up the ureter into the renal pelvis, having its tip coated with a highly polished but impressible wax surface. This interesting means of diagnosticating the presence of a stone is, however, far less certain than the X-rays, and has therefore been very happily superseded by it; the wax tip remains, however, of value in cases of ureteral calculi where it may give certain knowledge both of the presence and of the exact position of the calculus.

I will now briefly discuss several practical points relating to the technique of the operation upon the kidney.

*The Ureteral Catheter.* I find the ureteral catheter of value in many operations for renal calculi in two ways: In the first place, before the operation, the catheter is passed up the ureter into the pelvis of the kidney, which is then thoroughly irrigated and washed out by letting water flow into it from a funnel, in

this way distending the pelvis; the water then escapes down the ureter into the bladder, and out into a receptacle through a catheter introduced through the urethra; boracic acid or a weak carbolic acid solution may be run through the kidney in this way, washing away the pus, and rendering the surfaces relatively clean. The second use of the catheter is after washing out the pelvis to leave it *in situ*, and then to expose the kidney by the lumbar incision; before incising the kidney, however, fluid is forced rapidly into the renal pelvis, so as to distend the pelvis and cause the kidney to swell up, making prominent certain surface landmarks which serve as a guide for a correct incision into the organ. If the kidney is grasped in the full hand during the distension the exact position of the calices can be detected, as it alternately swells and collapses as the fluid is forced in. If one part is sacculated, or if the cortex is thinner at one point, this is also at once evident, and the incision is best made there. In normal kidneys this distension is almost imperceptible on the convex surface, but where calculi are present the antero-posterior diameter is sometimes increased 1.5 centimeters.

The lobules of the kidney are made prominent and the fibrous vascular septa between them are readily distinguished when the kidney is distended. If the kidney is cut into in this distended state, there is less injury to the cortex, and the operator is at once made aware of the opening into the pelvis by the sudden gush of water. A small stone is sometimes washed out in this way, saving a painstaking search and further cutting. The irigation of the pelvis of the kidney out through the incision by means of the renal catheter can be kept up as long as the catheter is left in and the wound remains open. The use of the catheter to distend the kidney was first suggested to me by Mr. Broedel, to whose anatomical studies I am constantly indebted in this paper.

*Site of Incision.* The question of maximum importance in the surgical treatment of renal calculi is the best position for the incision through the substance of the kidney into the calices and the pelvis. Operators often speak of making a post-mortem incision down the dorsum in order to lay it freely open, and so as to expose the renal pelvis. Mr. Broedel's researches have developed the important fact that the vascularization of most kidneys is provided by two arterial systems which are completely separated by the renal pelvis. There is a major system, carrying three-fourths of the arterial blood providing for the anterior, and a part of the posterior half of the kidney, and a minor system, carrying one-fourth of the arterial blood providing for the remaining posterior portion. The nearer the surgeon makes

his incision in the line which divides these completely separated systems, the less blood is lost. If, however, he strikes the major vessels of either of these systems the hæmorrhage may be frightful, even great enough to cost the patient's life.

The more a pelvis and the calices are distended the further are the two vascular systems separated. While in cases with normal undistended pelvis there is rarely more space than a few millimeters between the anterior and posterior vascular plane, quite the opposite occurs in distended pelves when the two vascular systems are not infrequently parted by as much as two centimeters or even more.

Certain easily recognizable anatomical landmarks on the surface of the kidney afford a guide to this important relatively non-vascular zone sufficiently reliable for practical purposes. If the kidney is examined attentively it will always be found divided up into irregular areas (the bases of the pyramids) the size of the end of the thumb; these areas are bounded by lighter colored lines which are often slightly depressed. These whitish lines represent the columns of Bertini, which extend up between the pyramids forming the framework which supports and carries the vessels. The white lines come together in a longitudinal white line on the anterior surface, which I propose to call Broedel's white line. When the white lines which divide the pyramids cannot be found easily, their position is often marked by little groups of stellate vessels.

The best place, then, to incise the kidney is down through the lateral portion of the posterior pyramids between the anterior and posterior vascular trees. The worst possible incision is the one which follows the course of or wounds largely the vascular column found in the cortical septa between the pyramids. In order, then, to make the incision correctly, one must cut parallel to Broedel's line and parallel to the posterior surface of the kidney, leaving about three-fifths of the kidney anterior and two-fifths posterior to the incision. The cut must be extended in a parallel direction to the posterior surface and not angling towards the centre of the kidney, as one would naturally incline to do. Through such an incision, laying open the calices, both anterior and posterior systems of calices can be readily explored.

These rules hold good when the topographical anatomy of the kidney is normal or nearly normal. About two-thirds of all kidneys are constructed on these lines, and in all such cases the landmarks just given will prove a reliable guide.

Owing to irregularities of fetal development the circulation of the kidney may assume a more or less abnormal character. The effect of such abnormal arrangement upon the circulation along

the lateral border may be such that the least vascular plane is shifted forward, so that it comes to lie in the plane of median section or may extend even into the anterior portion of the kidney. Conditions of this kind are, as a rule, recognized in two ways:

1. By the form of the kidney, which shows Broedel's longitudinal white line not on the anterior surface, but further back, as well as by the bulging of the posterior surface of the kidney (which is much flattened in normal cases).

2. By the arrangement of the large arterial trunks at the hilum. If the palpating finger feels as many vessels entering the parenchyma anteriorly to the pelvis as posteriorly, this would be an indication for an incision through the middle of the lateral convex border. If there are even more vessels posteriorly to the pelvis than anteriorly (extremely rare), the least vascular plane would be found in the anterior third of the kidney.

To reiterate: The incision should pass parallel to the longitudinal white line, one centimeter away from it and on the same side of the kidney where the palpating finger feels the lesser number of vessels, in the majority of cases on the posterior surface, but occasionally anteriorly.

Where the renal pelvis is not divided, after extracting the stone, I then explore the remaining calices with a little delicate steel curved handle attached to a blunt knife, which at once reveals the presence of even a small stone by the grating sensation conveyed. When a stone is found the blunt curved handle may be pushed up into the calyx and the incision made down through the prominent part of the corresponding pyramid, and the stone extracted in this way through a small additional incision, in case it cannot be lifted out with forceps through the original incision. In place of one long incision laying open the entire pelvis of the kidney, Dr. Finney has recommended, and I have resorted to, two incisions into upper and lower poles separately, so as to spare the median portion of the kidney. Such a procedure, of course, is applicable only if we have to deal with a double pelvis, or if we are sure that an undivided pelvis is of simple formation and capacious; it is contraindicated where there is a pelvis of complex form with many pockets.

It is best, as a rule, not to try to remove a stone directly through the pelvis of the kidney without incising the renal tissue proper. I would resort to this plan only where the stone is known to be a small one, and there is no inflammation or œdema of the pelvis, and where the pelvis can be exposed, incised and sutured without much difficulty.

*Suturing the Kidney.* Where it is advisable to close the wound

into the kidney we receive from Mr. Broedel's studies some valuable hints as to the best methods of suturing the kidney so as to close the pelvis and bring its surface into accurate apposition and prevent the further bleeding. Three sets of sutures may be used to advantage, one of fine catgut placed between the calices including the fat and fibrous tissues without involving the mucous surfaces. By this means the pelvis is approximated.

The second series of sutures, the most valuable, as devised by Dr. Hunner and Mr. Broedel, are one or two series of mattress sutures introduced with a straight, slightly-blunted needle, extending through the entire substance of the kidney. These give a perfect and sufficient control over bleeding. Finally, for perfect accuracy the capsule may be closed by a continuous catgut suture.

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## L. LIGATION OF THE ABDOMINAL AORTA FOR ANEURISM

By ROBERT T. MORRIS, M. D.
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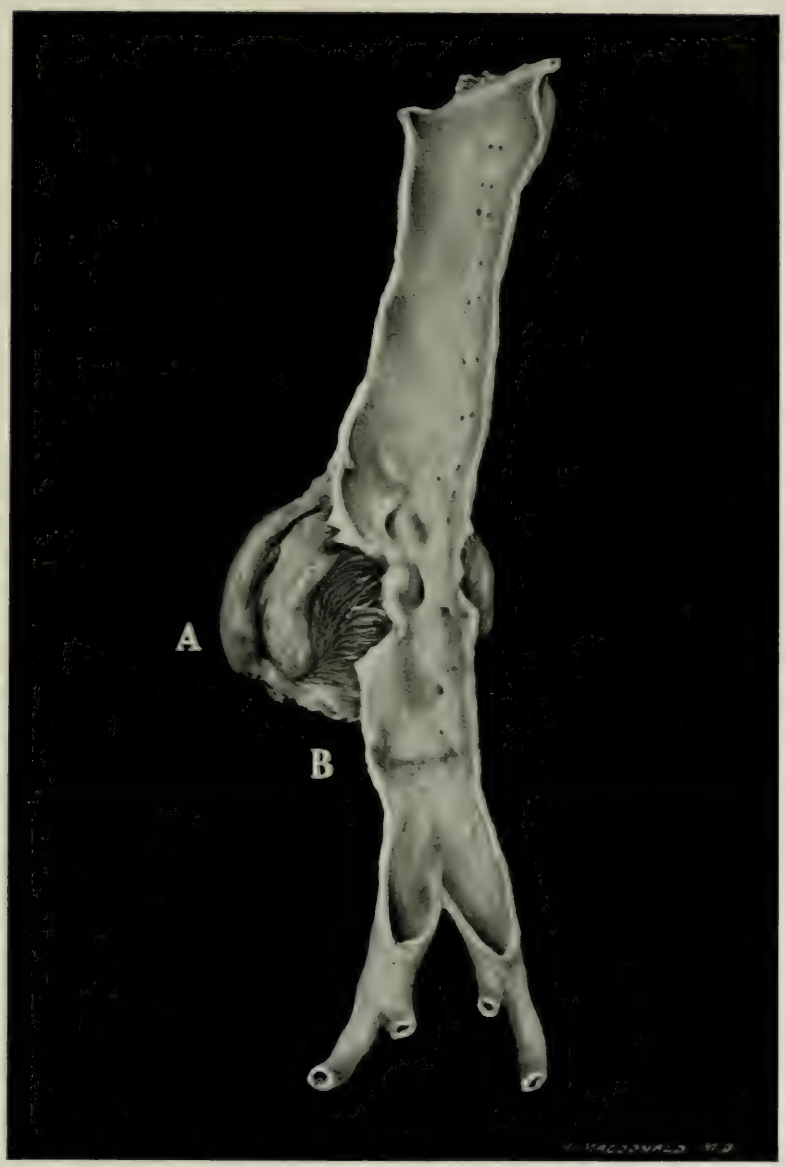
This is the fourteenth case in which the abdominal aorta has been ligated and the operation recorded. All of the patients have died, but there is evidence that the operation may be successfully accomplished in the near future. Ten of the operations were done before the days of antiseptic methods in surgery, and almost all of these patients died within a few hours of the operation. Of the four ligations of the aorta, done presumably under antiseptic precautions, Dr. Keen's patient lived for forty-eight days, Dr. Tillaux's patient for twenty-nine days, while Dr. Milton's patient died suddenly on the day after operation from "anæmia and shock."

My patient died of septicæmia on the third day after operation. I will append notes of the thirteen other cases, and in reporting my own case here merely quote the salient points that have value from a surgical point of view. The voluminous notes of the full record are on file among the records of cases at the New York Post-Graduate Hospital.

The patient was a colored woman, twenty-four years of age. She gave no history of syphilis, but a post-mortem examination of the aorta showed atheroma that was evidently syphilitic in character. She also had suppurative nephritis of the left kidney, caused by the ulceration of large nodules of gumma in the kidney.




Interior view of thoracic and abdominal aorta showing involvement of wall from coeliac axis to mesenteric arteries in an aneurismal sac. A. Sac filled with firm clots. B. Break in tunica intima which developed after specimen had been hardened in formalin and alcohol, but which was not apparent in the fresh specimen at the site of the ligature.

She entered the Post-Graduate Hospital on April 30, 1901, with a history of aortic disease dating back four months. At first there had been constant pain in the right epigastrium, and she had been treated for gastritis and pleuro-pneumonia at two New York hospitals at a time when a diagnosis of the real condition must have been difficult, if not impossible. The epigastric pain was accompanied by vomiting so severe and so continuous that at the end of two months she was too feeble to walk. At about this time she began to notice a pulsating tumor in the epigastrium which rapidly increased in size.

The record of vital signs shows that on entrance to the hospital her temperature was 100° F., pulse 80, and respiration 26; there was a mitral regurgitant murmur of the heart; her lungs were normal; urine loaded with pus, albumen and casts. Examination of the abdomen showed on inspection an epigastric tumor pulsating so forcibly that the pulsations were visible at a considerable distance from the patient, and the objective signs of aneurism of the aorta were typical of that condition.

The operation of ligation of the aorta was done on the afternoon of May 1, 1901, at 1:30 o'clock. A six-inch incision was made from the ensiform cartilage down to the umbilicus. The aneurismal sac apparently extended at its base from the cœliac axis to a point caudad from the mesenteric vessels. My plan was to employ temporary ligation of the aorta in order to allow the sac to fill with clots, and then to remove the ligature and allow the circulation in the extremities to continue as before.

For purposes of ligation I chose a soft rubber catheter about twelve millimeters in circumference, in order to avoid injury of the tunica intima. The aorta having been isolated from surrounding structures for a short distance, the catheter was carried around it with the aid of an aneurism-needle threaded with a loop of silk. The loop of catheter surrounding the aorta was then drawn tightly until circulation in the femoral arteries ceased, and a long clamp forceps held the catheter in place. This avoided tying. The ends of the catheter and of the forceps were allowed to protrude from the abdominal wound, which was sutured, with the exception of room for the ligating apparatus. The ligature was applied at a point about two inches caudad from the aneurism and one and a half inches cephalad from the bifurcation of the aorta.

The operation required thirty minutes in time, the larger part of which was expended in controlling hæmorrhage from the numerous vessels in the subperitoneal tissues about the aorta. The operation may be done in about fifteen minutes by one who is fairly skillful.

At the moment of tightening the ligature about the aorta the patient's pulse went to 148 and respirations to 48; the pulse at the wrist became hard and throbbing; the patient's skin was warm and moist. One and one-half hours after operation the pulse was 120, respirations 48. Three hours after operation the temperature was 98.5° F., pulse 120, respirations 60. Nine hours after operation the balance between the vital signs was restored, with a temperature at 100°, pulse 104, and respirations 36. Nine hours after the operation the patient's legs became warm for the first time, although the bed had been arranged with hot bottles immediately after the operation. The patient complained of intense pain in the legs and a

feeling of numbness. The pain was so great as to require the use of morphine, and even this did not give her much relief.

I had intended to keep a record of the excretion of urine, but, as urine and fæces were both lost by involuntary movements, the record cannot be accurate. Nineteen hours after the operation the patient could feel the prick of a pin over the vastus muscles, but the legs showed general loss of sensation. Twenty-two hours from the operation, the heaving, expansile pulsation of the aneurism suddenly began to diminish while I was palpating it, and it diminished so rapidly in size that when I returned about an hour later for further examination the tumor seemed to have diminished at least one-half in size. In about three hours the aneurism had apparently disappeared. Twenty-seven hours after the operation I removed the ligature from the aorta by uncoupling the forceps and drawing out the catheter. Immediately on removing the ligature the pulse went to 140 and was rapid and irregular, but dropped quickly to 60, with regular pulsations. The pulsation in both femorals showed that circulation in the extremities was restored. Sensation was restored and sphincter control was regained. The patient became very quiet and more comfortable than at any time since the beginning of her trouble. She was feeling very hopeful and had a pleasant chat with her husband, and during the day gave every prospect of a successful outcome of the operation. On the following night, however, she began to develop evidences of intense septicæmia, and died of septicæmia fifty-three hours after operation.

On post-mortem examination it was found that the septicæmia was caused by gangrene of small portions of the bowel which had lain in contact with the steel forceps. This is a danger which I had not anticipated in the case, but which we know sometimes does occur whenever any rigid instrument is left in contact with abdominal viscera. Infection from the gangrenous bowel had extended to a serous collection in the vicinity of the wound, and the patient was overwhelmed with violent septicæmia, which she was unprepared to resist on account of her disabled kidneys, weak physical condition and lack of nourishment.

The aneurism was found to have been a dissecting aneurism involving the wall of the aorta from the cœliac axis to the mesenteric vessels. It was solidly filled with blood-clots, but leaving a patent aorta. An embolus was found in the left internal iliac artery, but there was no evidence of injury to the aorta at the site of ligation. Some time later, after the aorta had been hardened in formalin and alcohol, the tunica intima showed a tendency to crack at the point where the ligature had been applied.

The case demonstrates that an aneurism of the aorta can be made to fill with clots by the application of a temporary ligature to the aorta, and that circulation in the extremities may be re-established on removal of the ligature.

The records of cases of ligation of the abdominal aorta were compiled by Kast in the *Deutsche Zeischrift für Chirurgie* in 1879, by Liebrecht in 1885; in the *Journal d'Accouchements*, etc., and by Keen, in 1900, in the *American Journal of the Medical Sciences* for September.

Notes of the cases operated upon to date are here appended.

Astley Cooper. ("Surgical Essays," London, 1828, Part i, p. 201.)—Patient, a man aged thirty-eight.

*Indication.* Aneurism of left external iliac. Attempts to compress with the tourniquet had caused pressure-gangrene with erosin of sac and profuse hæmorrhage.

Operation performed June 25, 1817. Incision three inches long, beginning above the navel and avoiding the latter. Opening of peritoneal sac. Finger carried between intestinal coils to spine, locating aorta. Superjacent peritoneum nicked with finger-nail, and vessel tied with aneurism-needle from behind forward.

*Immediate Results.* Sensation of cold and disturbed sensibility in lower extremities. After ten hours, warmth and feeling reappeared on right side. On the following day (patient had been operated on in the evening, 9 p. m.) the condition gave ground for a hopeful prognosis.

In the afternoon a turn for the worse. No peritoneal reaction, but great anxiety and vomiting. Pains in the loins and head.

Temperature of right leg, 94° in the morning, 96° in the evening; of the left leg, 85.5° a. m., 87.5° p. m. On the second day after operation temperature of right side normal, while left leg was livid. The general state became progressively worse; involuntary defecation; condition bordering on collapse; somnolence and death. Patient lived forty hours after operation.

*Autopsy.* Not the least sign of peritonitis. Ligature had been truly applied. External wound had begun to heal. The vessel had been tied one inch above the crossing of the duodenum. A thrombus had formed one inch above and below the ligature.

J. H. James. (*Medico-Chirurgical Transactions*, 1830, Vol. xvi, Part i, p. 1.)—Patient, a man aged forty-four years.

*Indication* A very large aneurism of the internal iliac with threatened rupture. Fruitless attempts had been made to heal the aneurism by ligation of the femoral.

Operation performed July 5, 1829, 2 p. m. Cooper's method essentially followed. Incision longer, extending farther towards symphysis. Opening of peritoneal cavity followed by extensive prolapse of inflated intestines. Very difficult to get through intestinal coils and also to divide posterior peritoneum. Latter had to be transfixed with the needle, which broke during the procedure. Aorta finally tied; prolapsed intestines replaced.

*Immediate Results.* When ligature was drawn tight, patient immediately felt a deadness in his legs. Slight collapse requiring stimulants. Pains in limbs despite narcotics. Headache. The temperature of the limbs soon fell below that of the body. Patient complained more and more, and died about four hours after operation.

*Autopsy.* Intraperitoneal hæmorrhage of considerable extent. Intestines showed no alterations. The aorta had been ligated one inch below the duodenal crossing. The ligature not clean, as the dense fibrous tissue which connected the peritoneum with subjacent parts had been included, also a small lateral twig of the inferior mesenteric vein. Incomplete thrombus formation, both central and peripheral.

John Murray. (*London Medical Gazette*, 1834, Vol. xiv, p. 68; Vol. xv, p. 6.)—Patient, a male aged thirty-three years.

*Indication.* Rapidly growing aneurism of the right external iliac, going over into the common iliac.

Operation, January 26, 1834, 11 p. m. Right lateral decubitus. Superficial incision in left side, extending from end of tenth rib to one inch before anterior superior spine of the ilium. Incision about six inches long, convex behind. Dissection to peritoneum. Latter not opened, but detached by the hand from the spine and the ilio-psoas fascia. Aorta found, isolated with finger-nail and elevator, surrounded with aneurism-needle, and tied. Little blood lost.

*Immediate Results.* No disturbance of any sort when ligature was tightened. Collapsed for fifteen minutes after operation. The hitherto healthy left limb began to feel numb and helpless. Vesical tenesmus persistent. Patient could move either leg at will. Finally fell asleep.

On the following day violent pains set in in both limbs and pubic region. Right leg, 89.5°; left, 88.5°; axilla, 98°. Pulse 120, even. No sign of peritoneal reaction. Headache, with tense carotids. Radial pulse hardly perceptible. Anxiety, cold sweats. Both legs cold, anæsthetic. Collapse and death. Patient lived twenty-three hours after operation.

*Autopsy.* Peritoneum healthy. Some organic disease of bladder. Aorta had been ligated between three and four inches above bifurcation. Melted wax had been thrown into the thoracic aorta. Abdominal aorta contained wax up to one and one-half inches of ligature. Omentum, mesentery, and intestines finely injected with wax. In only one locality was there evidence of anastomosis to form collateral circulation (inferior mesenteric with internal iliac). Aneurism becoming gangrenous.

B. C. Monterio. (*Lancet*, 1842, Vol. i, p. 334.)—Patient, a man aged thirty-one years.

*Indication.* Aneurism of right femoral, which, however, had been diagnosticated during life as aneurism of the external iliac.

Operation performed August 5, 1842, at 2 p. m. Position right lateral, with legs extended. Incision of soft parts from free end of last rib to anterior superior spine of ilium. Tissues divided down to peritoneum. Patient then placed upon his back and the shoulders and pelvis both elevated to lower intra-abdominal pressure. Peritoneum then carefully detached from subjacent structures. An assistant introduced his hand to make retraction and the operator ligated the aorta, one end of the ligature being allowed to emerge from the external wound.

*Immediate Results.* No collapse, but sweating, slight dyspnœa, and pulse small though regular. On the first day the chief symptoms were thirst and dyspnœa; the day following operation restlessness and vomiting added, and later in the day quick pulse and abdominal pain. Second day after operation became comfortable, but had slight jaundice. Nocturnal exacerbation of thirst, pains in chest, etc. Legs freely movable. Fourth day after operation crural pains returned and pulsation in lower part of tumor. On the sixth day following operation, pus escaped along the ligature. On the ninth and tenth days hæmorrhages from the wound, which had partly healed. Legs now became cold and could not be warmed. Abdomen

bloated greatly, frequent vomiting, much pain. Death on the eleventh day. Patient had survived eleven days and twenty hours after operation.

*Autopsy.* Peritoneum unchanged. Aorta had been tied four lines above bifurcation. A perforation had occurred opposite the knot of the ligature. No central and only incomplete thrombus formation.

South. (*Lancet*, 1856, Vol. ii, pages 47 and 222.)—Patient, a man aged twenty-one years.

*Indication.* Diffuse aneurism of left common iliac and left external iliac.

Date of operation, June 21, 1856, at 2 p. m. Superficial incision in left of flank, beginning just above the anterior superior spine of the ilium and extending to the tenth costal cartilage. Peritoneum opened laterally. Retraction of wound and ligation performed.

Patient did remarkably well after the operation, but died forty-three hours after the intervention. (Details fail.)

An autopsy was performed, but there were no pathological findings aside from the aneurism.

Hunter McGuire. (*American Journal of the Medical Sciences*, 1868, No. cxii, p. 415.)—Patient, a man aged thirty years.

*Indication.* Aneurism of left external iliac artery, both common iliacs, and the lower extremity of the abdominal aorta, with threatened rupture.

Date of operation, March 30, 1868, at 1 p. m.

*Operation.* Left-sided laparotomy, incision from last costal cartilage to spine of ilium. Exposure of peritoneum. Index-finger between latter and fascia. The first incision was but one inch long, and was completed with the inserted finger as a guide. Intestines pushed aside and the aneurism exposed at its upper portion. Under manipulation, it ruptured with escape of a pint of blood, which was carefully removed, the aorta having been ligated.

*Immediate Results.* Patient had a transient collapse, from which he recovered. The first evening, pulse weak, legs numb, and there was frequent vomiting. The body temperature (axilla) was 96° F.; temperature in knee-hollow, 89°; of feet, 82°. Urine drawn. Patient drowsy and slept. During the evening, some reaction, skin and extremities becoming warm. After two hours' sleep patient waked up very anxious and complained much of pain. Had full doses of whiskey and opium. He again fell asleep, and waked after another hour very restless and with great pain in legs. These symptoms progressively increased until the death of the patient at 12:30, preceded by paralysis of the sphincters. Patient lived eleven and one-half hours after the intervention.

*Autopsy.* Intestinal viscera healthy. Ligature had been placed at the level of the inferior mesentery, and the left ureter, which had been embedded in the sac, had been enclosed with it. The sac had ruptured just above bifurcation.

William Stokes. (*Dublin Quarterly Journal*, 1869, Vol. xlviii, p. 1.)—Patient, a man aged fifty years.

*Indication.* Diffuse ilio-femoral aneurism involving the right common iliac, internal iliac, and upper part of femoral.

Operation performed March 8, 1869, in the forenoon.

*Operation.* Semilunar incision five and one-half inches long in left side

from one inch below the tenth rib to two finger-breadths above the junction of the middle and internal third of Poupart's ligament. Soft parts incised down to peritoneum on a grooved director; parietal peritoneum slightly wounded, with insignificant protrusion of peritoneum. Peritoneum separated from subjacent tissues with the hand. Sac and aorta exposed with difficulty. A silk ligature was applied, the ends of which were attached to a Porter artery-compressor, the object being to apply a "temporary ligature." No blood lost worth mentioning.

*Immediate Results.* Considerable shock from the intervention, successfully combated by brandy. Legs became cold, the right more so than the left. No paralysis of any sort. Left leg kept drawn up. Two hours after operation great restlessness. Patient screamed with pain at intervals, referred to ball of the great toe, sole of the right foot, and hollow of right knee. No cause could be found for these pains. About 3 p. m. patient became better, ate and slept. Temperature of left limb "very good," of right limb somewhat increased. Between 5 and 6 p. m. syncopal attacks controlled by stimulants. At 9 p. m. femoral pulse perceptible. At 10 p. m. collapse, stupor. Death at twelve o'clock, midnight. Patient had survived thirteen hours.

*Autopsy.* The aneurism had begun to wear away the pelvic bones. The compressor had grasped the aorta alone. Water could not be forced through from above. Intima not altered. Patient had a fatty heart (degeneration); other viscera, etc., normal.

P. H. Watson. (*British Medical Journal*, 1869, Vol. ii, 216, and personal letter to Liebrecht in *Journal d'Acouchements*, etc., November 30, 1885.)—Nothing as to *personnel* of patient.

*Indication.* Nine weeks before the external iliac had been ligated (not stated what for). The wound had healed, but secondary hæmorrhage of an insidious character set in, and it became necessary to tie higher up.

Date of operation not stated. A massive clot had formed in the iliac fossa, so that the iliac artery could not be isolated. The abdomen then opened at the umbilicus, intestines and mesentery pushed aside, aorta exposed in front and tied below inferior mesentery.

*Results.* In the letter to Liebrecht it is stated that the patient lived a week; in the published report, but sixty-five hours. Patient did well for first forty-eight hours; gangrene developed in both legs, worse on affected side.

Czerny. (*Wiener medicinische Wochenschrift*, 1870, pp. 1, 402.)—Patient, a soldier aged twenty-seven years.

*Indication.* Wound received involving iliac artery.

*Operation.* Czerny tied the aorta above the bifurcation.

*Result.* The patient died twenty-seven hours after the operation of acute sepsis and hæmorrhage.

Czerny. (*Centralblatt für Chirurgie*, 1879, Vol. vi, p. 737.)—Patient, a man aged fifty years.

*Indications.* In removing a tumor of the kidneys, it was found impossible to ligate the renal artery successfully, so Czerny ligated the aorta at a point midway between the two renal arteries.

*Result.* The patient died ten hours after the operation, but the cause of death is not clearly stated.

H. Milton. (Of Kasr. el Aini Hospital, Cairo, London *Lancet*, 1891, Vol. i, p. 85.)—Patient, a man aged forty-five years.

*Indication.* He had been admitted to the hospital for an aneurism of the aorta. It had been intended to cut down and apply an apparatus for compressing the vessel against the spine; but before anything could be done, the aneurism underwent spontaneous rupture, as shown by the effacement of the circumscribed tumor and evidences of acute internal hæmorrhage.

Date of operation, July 3, 1890. Laparotomy was performed immediately after rupture. (The original tumor, as large as an orange, had been slightly to the left of the median line; pulsating and painful. Patient syphilitic and arterio-sclerotic, but in good health and with no history of trauma.)

Incision five inches long in linea alba; omentum and intestines pushed aside. Peritoneum over aneurism incised enough to admit fingers. The vessel was then compressed and isolated one inch above the aneurism, where the vessel was healthy. Needle readily passed about aorta eight lines above aneurism. Ligature of thick silk. Peritoneum sponged dry. Wound closed without drainage. The escaped flow from rupture all lay behind peritoneum, where it was left untouched. Duration twelve minutes; all pulsation ceased.

*Immediate Results.* First rally one hour after operation. Patient complained of intense pain and tingling in both legs. Passed thirteen ounces of urine, free from albumen or blood. Death occurred suddenly day after operation, of anæmia and shock. Patient survived operation twenty-four hours.

*Autopsy.* Aneurism limited to aorta. Upper limit, one and one-half inches below renal arteries; lower limit, three-fourths inch above bifurcation. Rupture at left margin of lower surface. Four pounds of blood had escaped. No other pathological changes.

Tillaux. (*Lancet*, 1891, Vol. i, p. 85.)—Patient, a man aged fifty-six years.

*Indications.* Aneurism of the left iliac artery of a year's duration. Part of the wall of the artery ruptured. Aneurism became diffuse, reaching to the wall of the umbilicus.

*Operation.* Artery was ligated with silk above the bifurcation. There was no pain or circulatory disturbance after the operation; but it was found on post-mortem examination that the lumen of the artery had not been entirely occluded.

The patient lived twenty-nine days, and the cause of death is not clearly stated; but Tillaux notes the suffering from excessive venous congestion.

Keen. (*American Journal of the Medical Sciences*, September, 1900.)—Patient, a man aged fifty-two years.

*Indications.* Admitted to Jefferson Medical College Hospital November 8, 1899, with epigastric tumor caused by an aortic aneurism, together with a large hæmatoma from rupture of the aneurism.

*Operation.* Operation for ligation of the aorta was done on December 22, 1899. A midline incision was made from the ensiform cartilage to the umbilicus, and a ligature of floss silk was applied close to the diaphragm. Immediately after operation the patient's legs were cold, but sensation was little disturbed and motion not much impaired. Eight days later there was

some pulsation of the femoral arteries and the legs were warm. There was still some aneurismal bruit and distention.

The patient was apparently making a recovery from the operation, but died on the forty-eighth day from hæmorrhage at the site of the ligature.

### Discussion

Dr. A. T. Bristow, of Brooklyn: In the treatment of aneurism of the abdominal aorta, three factors should be borne in mind: first, hydrostatic pressure in the artery; second, the mechanical action of the ligature, and, third, the fact that we are dealing with a diseased and not a healthy vessel. With regard to the first question, hydrostatic pressure in a vessel of large calibre, while the same per inch, is very much greater over the entire area. The hydrostatic pressure increases rapidly with the area of the vessel, and consequently, the greater the danger of hæmorrhage. Next, the mechanical action of the ligature: the larger the vessel the more wrinkling we get. When a ligature is applied to the aorta it will crumple into several folds, leaving an angle at each. Dr. Norris avoided that by using a soft catheter. There are a number of cases on record which were treated only by pressure and which resulted in a cure, while none of the operated cases survived. Now, the practical point is that pressure brings the coats of the aorta together for a large area without making any sharp angulation, such as we would get from a ligature. It occurred to me that it would be possible to suture the aorta. Accordingly, I procured a dog, weighing seventy-five pounds, and sutured his aorta in an oblique line in two places. At the end of four months the dog was still alive. I then re-opened his abdomen and found that the aorta was occluded. Whether the same principal could be applied in cases where the vessel is diseased I cannot say.

Dr. Morris: I attempted, in my case, to overcome the difficulty of hydrostatic pressure by applying a temporary ligature. By this measure we allow the aneurism to fill in before any damage to the arterial walls occurs.

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## LI. MUSCULAR ATONY AN IMPORTANT FACTOR IN UTERINE DISPLACEMENTS

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The importance of the familiar subject of uterine displacements is universally recognized by teachers and writers on gynæcology, who usually devote to it a considerable portion of their lectures and text-books. In no field of surgery has greater ingenuity been displayed in reviving and modifying long forgotten operations and devising new ones than in the correction of malpositions of the uterus. In fact, the student and practitioner at the present day are apt to infer that the subject has become

purely a surgical one, the non-surgical treatment of displacements being relegated to the past history of gynæcological medicine. The result has been that the present generation of medical students is inclined to look with a certain amount of contempt upon the homely pessary and the long and patient use of tampons—the proper application of which, as Dr. Emmet taught us many years ago, calls for no small amount of special training, anatomical knowledge and good judgment. We have often forgotten also the elementary principle insisted upon by that revered teacher that deviations in the position of the uterus are *per se* practically unimportant so long as it does not sink below its normal place in the pelvis. It is interesting to note that simple retroversion is now regarded as clinically significant rather because of the accompanying complications than of the displacement itself.

Although this is generally admitted, we do not apply this principle to our operative treatment of the condition, but go on repairing the cervix and pelvic floor, shortening the round ligaments, or performing ventro-fixation or vagino-fixation, according to our individual theory as to the ætiology and the best way of obtaining an anatomical cure, frequently oblivious of the fact that the symptoms may persist with the uterus in its normal position. This leads me to explain why I take the liberty of introducing such a hackneyed subject. It is simply for the purpose of emphasizing briefly an important point in the ætiology of uterine displacements which has long been recognized theoretically, but has not had the practical application which it deserves. There is nothing new about the subject, but a proper application of it seems to me to be the key to many failures in operations which are perfectly successful anatomically. It is only another illustration of the fact that the gynæcologist must study his patient from a broader view-point than that of the pelvis alone.

The usual explanation of the text-books that retroversion and prolapsus (excluding the rare congenital and acute cases) are due either to an over-weighting of the uterus or to a weakening of its supports, especially the pelvic floor, does not always hold true in actual practice. How commonly we meet with large fibroid uteri in women who have borne children, entirely unaccompanied by pressure symptoms! Yet here is an immense increase in the size and weight of the organ, perhaps with an extensive rectocele and cystocele. On the other hand, a flabby young woman gets up in three weeks from an easy labor, with a perfectly normal convalescence; there have been no apparent puerperal lesions, the uterus undergoes rapid involution, but it

is retroverted, and that retroversion is accompanied by such dragging, bearing-down pains that the woman is practically a semi-invalid. Even when the displacement seems to be perfectly corrected by a pessary, her disability is only slightly diminished. How account for this difference? It is clearly one of general loss of tone, and is not of local origin.

The entire absence of symptoms in patients with laceration through the sphincter, associated with retro-displacement, provided that their general muscular condition is good, is so common as to need only a passing mention.

I have never been able to subscribe to the theory that retroversion and prolapsus following an easy non-instrumental delivery are due directly to subinvolution of the uterus and its ligaments. How do we infer this? From the size of the uterus? But uteri of all sizes are found in perfectly normal position. From its mobility? But why should not its range of mobility be increased for a long time after delivery, when we remember the physiological softening and elongation of the sacro-uterine ligaments? To my mind, the difference in these patients under similar conditions lies not so much in the size and weight of the uterus or the overstretching of its ligaments as in the difference in muscular tone—the muscles of the abdomen, of the pelvic floor, of the vagina. Of course, we exclude from this category displacements due directly to local causes—the presence of neoplasms, inflammatory adhesions, extensive puerperal lesions, etc. The intimate relation of this subject to enteroptosis will at once occur to you, but we cannot discuss it here.

It is a well-known clinical fact that women with laceration of the pelvic floor and moderate prolapsus of many years' standing often have no symptoms leading them to consult a gynæcologist until after the menopause, when the uterus has become so atrophied that its weight is insignificant. Then, in consequence of loss of muscular tone (since no new pathological factor has been added), the uterus sinks lower in the pelvis or may become completely prolapsed and the patients experience the dragging, bearing-down sensations incident to that condition. It is a matter of surprise to them that they should now suffer from the effects of a childbirth which occurred twenty years before, when they were never obliged to consult a doctor before for local trouble. The benefit derived from wearing an abdominal bandage is often so marked as to warrant the inference that it not only relieves the weight of the intestines and the misdirected intra-abdominal pressure which tend to force the pelvic organs downward, but actually reinforce the weakened muscles.

Too little stress has been laid upon the supporting power of

these muscles in maintaining the uterus in its normal plane. Kellogg (whose experience with the operation of shortening the round ligaments is probably unequaled) recognized their importance when he insisted that the surgical treatment of retroversion was only the first step in the cure, and that after restoring the uterus to its normal position and strengthening its natural supports, a further course of massage and electricity was necessary in order to restore the general muscular tone. Doubtless many of our symptomatic failures are due to the fact that we do not apply this important lesson.

In my own experience (which must be shared by other surgeons) I have been chagrined by the poor results obtained with combined operations for prolapsus in patients with flabby, relaxed abdominal walls. In one instance in which I amputated the cervix uteri, performed anterior and posterior colporrhaphy, and finally fixed (not suspended) the fundus uteri at a point half way between the umbilicus and pubes, within a few months the uterus rested upon the floor of the pelvis, having actually pulled down and inverted the anterior abdominal wall at the point of fixation, in spite of the support furnished by an abdominal bandage, a narrowed vagina, and a firm pelvic floor. The symptoms were but slightly relieved.

These facts being admitted (and they can hardly be questioned, as they are matters of common observation, and not of theory), it remains to ask if we should not apply them to the treatment of every case of uterine displacement, whether surgical or non-surgical. They certainly have an important bearing on the question of prognosis, as well as on that of treatment. We cannot expect our patients to share in our enthusiasm over a successful operation if they do not experience the promised relief. To most women it is a matter of comparative indifference what position the uterus occupies if the malposition gives rise to no symptoms. And it is small satisfaction to them merely to know that the natural equilibrium of the pelvic organs has been restored if they feel just the same as they did before—or worse. It is obvious that but little benefit will accrue from replacing a retro-displaced uterus and inserting a pessary when the pessary itself receives no support from a relaxed vagina and pelvic floor. The mere result that the organ remains in an anterior position is entirely offset by the fact that it continues to sag downward as much as before. Nor do we greatly improve the situation when by plastic operations on the uterus and vagina we diminish the size of the prolapsed organ and furnish a *point d'appui* for the pessary, provided the flabby state of the muscles leads to a speedy recurrence of former conditions.

There is something lacking which cannot be restored by surgical intervention. The proper appreciation of this fact may sometimes deter us from giving a too confident prognosis.

Even when we go a step further and shorten the round ligaments, or suspend or fix the uterus (whether by the vaginal or abdominal method), in addition to the plastic work, there is a certain class of cases in which we can predict at the start that the symptomatic cure, at least, will be only temporary. If we learn to recognize these beforehand, we may be inclined to make less emphatic promises with regard to the benefit of the operation *per se*. Not that operations may not be perfectly proper even in the case of such flabby, atonic subjects as are those to whom I refer, but the results will be much better if we impress upon the patient and her physician the fact, already stated, that the treatment does not end with the operation—or *begin* with it, for that matter. Restoration of the general muscular tone by such means as are well known to you—massage, electricity, exercise, cold baths, abdominal support, etc.—is to my mind an essential feature in the treatment of such patients, both before and after operation.

The value of out-of-door exercise alone in relieving the symptoms due to retroversion and prolapsus was impressed upon me only to-day, when I saw a patient after an interval of several months, during which she had spent much of her time out of doors, especially on the links. The mother of three children, the youngest eight months old, when I last saw her, she was thin and anæmic, her abdominal muscles were flabby, and the pelvic floor was relaxed; her heavy retroverted uterus was kept forward, but not upward, by a pessary which she had been obliged to wear at intervals for two or three years. To all intents she could never be restored to health except by operative treatment. I removed the pessary last spring as an experiment, and she had not missed it. She stated that she had never felt better in her life than during the past summer, not having had a backache. I found her uterus still retroverted, but in its normal plane. There was an evident restoration of the lost power in the pelvic and abdominal muscles that had been brought about by nature, and not by art.

The importance of a "Nachkur" following surgical operations is not generally appreciated in this driving age, when immediate results are expected and often promised, the general condition of the patient being disregarded in the anxiety to obtain local relief. If there is any truth in the saying that a good gynæcologist must be a good general practitioner, here is certainly a field in which there is ample opportunity for its application.

I know that the surgeon who tries to use some discrimination in the selection of his cases, and even declines immediate operation in a case of displacement, when the indications seem to be clear, may lay himself open to the charge of timidity or ultra-conservatism, possibly of blindness to his own interests. But, after all, what is a man's opinion worth unless it is the crystalized product of experience, it may be bitter and humiliating? He may be all wrong, but for him it is, and must be, right until further experience has proved that his position is untenable.

In conclusion, the following deductions are offered for discusssion:

1. Muscular atony is an important factor in the causation of uterine displacements, either alone or associated with the usual factors, overweight of the uterus and weakening of its ligaments and the pelvic floor.

2. Mere restoration of the organ to its normal position with regard to the axes of the pelvis is not sufficient to cause permanent relief of symptoms, provided additional support is not afforded by firm pelvic and abdominal muscles.

3. The prognosis as to the cure of malpositions by operations is influenced by the general muscular tone of the individual.

4. Hence it should be the aim of the physician to endeavor to restore such a healthy condition of the muscles, either before or after operation, by appropriate treatment—baths, massage, electricity, gymnastic movements, out-of-door exercise, tonics, and such regulation of the patient's dress and mode of life as seem best fitted to the individual case. In short, the work of the physician often begins where that of the surgeon ends, if the result is to be complete and permanent.

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## LII. MEDICAL ASPECTS OF APPENDICITIS

By WILLIS E. FORD, M. D.

UTICA

Appendicitis may be a surgical disorder from the first, or it may become a surgical disorder at any time during its progress. It is not, however, a surgical disorder from the first in all cases. It is not true that delay in operating all cases of well ascertained appendicitis is always dangerous. Many cases of appendicitis must be operated at once or else there will be an unnecessary sacrifice of human life. To group all cases of appendicitis in one class and to make a general assertion regarding the necessity for

immediate operation and the futility of waiting until a diagnosis has been established beyond a doubt, is a mistake that has been common to writers who have for the most part supplied us with the literature which we have on appendicitis. The medical man is the one who is generally called first, and upon him rests the responsibility of the management of most cases of appendicitis. That he may be quite as well able to meet this responsibility and to conduct his case to a successful issue as a surgeon or specialist, who has specialized his work from the first without any experience in general medicine, goes without saying.

As a rule, the medical man makes a better diagnosis than the surgeon. He is better equipped for the work, and his training and practice ought to make him more cautious and exact in the matter of diagnosis than the work of the surgeon can do. It has been a great misfortune, it seems to me, that the views of medical men regarding appendicitis have sometimes been ignored and even ridiculed by the men who have done the most writing upon this subject. It will always be true that there are certain medical aspects of appendicitis, especially its diagnosis and management, until the services of the surgeon can be secured, and the after care of the case when surgery has been done. When physicians, therefore, are made to feel that their responsibility in these cases is as great as that of the surgeon, and that the life of the patient depends more upon the judicial frame of mind which the physician brings to bear upon his cases than it does upon the surgical technique, when the chance of losing a case because of delay will be much lessened, the danger of making the mistake of operating unnecessarily will be diminished; and at once there will be a feeling in the community that it is safe to have both the physician and surgeon without taking the risk of an unnecessary operation.

In this region, the trouble is not that the physicians are unwilling to have cases of appendicitis operated, but in many instances their clients refuse to have a surgeon called, saying that it always means an operation; and this leaves an unavoidable suspicion that sometimes an operation is not wholly justifiable.

It is said by good men that as many cases are operated for appendicitis when it does not exist as are delayed when the operation is necessary and is urged by the attending physician. However this may be, it is not fair to the physicians who hesitate on these grounds to say, that in the experience of most men the reckless advice to operate whenever there is pain in the abdomen without sufficient examination to establish the diagnosis of appendicitis, makes them hesitate to submit the question of

operation to the surgeon; and they are inclined to wait until the diagnosis is established beyond a doubt before seeking the advice of a surgeon.

When a surgeon proposes to operate for pain in the region of the appendix in a woman, without thorough examination of the pelvic organs so as to exclude the possibility of prolapsed ovaries or tubal disease, one may assume that he is not a safe man to consult. If he has not had much experience in this work he is not a safe man to operate until the diagnosis has been made for him by somebody else. In justification of this seeming criticism I would say, that I have now two patients, both young women, who were operated for appendicitis without careful vaginal examination. One of these was operated in Paris by a most distinguished general surgeon and the other in New York by a celebrated surgeon there. In neither case was there anything the matter with the appendix, though it was removed in both cases. There was, and still remains an enlarged, prolapsed and painful ovary in both instances, and there is also a hernia with no improvement in the symptoms or condition in either case. What can the physician or the gynecologist say but that these cases which were hurried to the operating table for pain would have been much better off if the medical aspects of the case had been more carefully considered? This is not an unusual experience, and if one chose it would be easy to fill the space of an entire paper with instances like these.

Laymen are pretty well posted regarding this much talked of disorder; and while they draw their inference and get their prejudices for or against the operation without sufficient facts to justify them, yet the physician finds that such prejudices have great weight in deterring him from doing what he thinks best for his patients, and often wholly prevents his bringing them to the operating table when he is convinced that it is the only safe method of procedure. Therefore, if we could agree upon the medical aspects of appendicitis there would be very little to disturb the harmonious relation between men who operate and those who do not. That the medical men are deserving of more candid treatment at the hands of the surgeon, I think must be admitted, when we consider that the operation for appendicitis is a simple one and probably the safest of all abdominal operations, and generally speaking requires no extraordinary surgical skill. It is equally true that to make an exact diagnosis in cases of obscure abdominal pain, intestinal obstruction, or uterine disease, requires great skill and experience. The medical facts which determine in the mind of the physician whether the case ought to be operated or not should be most carefully formulated. This

paper is chiefly a plea for a speedy and careful diagnosis of all suitable cases, and also for medical care which is not in the province of the surgeon, and which I think has been obscured by too loud a contention for surgery alone.

The legitimate sphere also of the medical man includes that of preventive medicine, and it is probably true that his advice regarding the condition of intestinal indigestion, and also regarding the recurrence of colics from intestinal catarrh, would prevent a great many attacks of appendicitis. In Belgium and France appendicitis as we know it in this country does not exist with anything like the frequency that we see it here. Distinguished physicians in these countries have told me that they see little of it, and that they believe the immunity to be due to the fact that coarse foods, improperly cooked foods, and large quantities of raw fruits, etc., cannot be afforded by a large number of people, or are not considered proper eating. As near as we can now get at it the high livers and those who most often have disorders due to high living are not especially prone to appendicitis; while young people, particularly athletic young people, are more liable to develop it.

It is a very doubtful question whether the action of the psoas muscle or any other muscle in these athletic young people has anything to do with the production of the disorder. It is altogether more probable that hastily bolted foods that remain in a half-digested condition, or too much food of a kind that is difficult to digest and which produces undue flatulence and stretching of the bowels, and possibly ptomaines may be considered as a cause. These are probably the causes of the majority of the attacks of appendicitis, and these are certainly the medical aspects which can be studied with great profit. Occasionally in operating we find a displaced or elongated appendix or one that seems to be shirred in its attachment to the meso-appendix. Its function, if it has one, is so little known that these facts have little more than an academic interest.

I doubt very much if appendicitis is frequently caused by traumatism. I recall two cases in which death occurred by blows in this region, one by a base-ball and one by striking on a hard object when falling. A general peritonitis and gangrenous condition from the bruise resulted rather than a rupture of the appendix in both cases. It is difficult to see how a blow could be received with sufficient force to materially hurt a movable appendix without doing infinitely more injury to the adjacent tissues.

It has been suggested that lithæmia may in some way promote the development of this disorder. I am inclined to believe that

certain conditions of the blood like lithæmia may be found to promote the development of appendicitis. Sufficient facts have not yet been brought forward to prove this, however, and this theory can only be worked out by physicians. Surgeons may speculate but physicians may find out.

This article, however, has to do with the causation only as it may bear upon the question of prevention, and here the physician may be of great service. The general idea is that over distension of the bowels with indigestible material of any kind; or the habit of constipation promoting the use of large doses of cathartic medicines; violent exercise soon after inordinate eating; and the neglect of wholesome cooking, all tend to the production of this disorder.

In all cases of sudden and acute pain in the abdomen, with or without vomiting or purging, the most careful examination of the whole abdomen should be made for the purpose of ascertaining whether the appendix may be the cause of the trouble.

I think it is a mistake to suppose that opiates given with discretion at this time can so mask the symptoms of appendicitis that it is dangerous to give them. It is better to give a light hypodermic of morphia than to give opiates by the mouth. When I first began to do abdominal surgery there was the same empirical cry, "Do not give morphia for pain after operation for fear of intestinal obstruction." There was and is no harm done by a single dose of morphia to quiet pain after abdominal section; neither is any harm done by giving a hypodermic to a howling child if the emptying of the bowels and the application of an ice coil do not relieve the pain at the beginning of an attack of appendicitis. Of course, this must not be repeated as it used to be in Flint's time in the same condition, then called idiopathic peritonitis. Physicians are not liable to do this, but the awful warning that a single dose of medicine to quiet pain is sure to mask the symptoms, seems to me to have been overdone. Not every case needs it, but a few cases do to prevent such shock and depression as will make immediate operation unnecessarily hazardous.

After the bowels have been thoroughly emptied in cases where constipation has existed for even a short time; or after the diarrhœa has stopped in cases in which the pain was accompanied by loose bowels, if a slight temperature continues and there is pain and tenderness in the region of the appendix which becomes pronounced, then an attack of appendicitis is strongly suspected.

During the first twenty-four hours of the attack an ice coil may be kept on the abdomen and the patient allowed little if any

food. After the first twenty-four hours a physical examination ought to reveal an appendicitis in almost every instance. The chief thing is the rigidity of the right rectus muscle as compared with its fellow, and a feeling of bogginess in the region of the appendix, with slight dullness on percussion, and with pain on pressure. If these symptoms and conditions are found the diagnosis is fairly well established.

In women an inflamed ovary may give rise to the tenderness, which ought to be excluded by a pelvic examination. A discharge of renal calculus will leave pain and tenderness with some resistance or even rigidity of the right rectus muscle. Careful palpation of the abdomen, however, from the left to the right side of the body ought to exclude the possibility of error, when taken in connection with the examination of the urine and the history of the case.

If the temperature and pulse return to normal after the first twenty-four hours, and the bowels have been freely moved, and there is no pain, it is safe to wait for another twenty-four hours without considering the question of operation. After forty-eight hours if the temperature rises and the pulse also follows, and the rigidity of the right rectus muscle becomes pronounced, then the question of immediate operation must be decided. This question must often be decided earlier providing the temperature and the pulse go up instead of subsiding after the first twenty-four hours. I believe the careful palpation of the abdomen will establish the diagnosis beyond a doubt; while the tendency to an increase of temperature, and the pain and tenderness on pressure will determine whether it is of the fulminating type of appendicitis requiring courage to operate within the first twenty-four hours, or whether it is a catarrhal form with a tendency to subside, or a catarrhal form with infection about the head of the colon which will produce an abscess later.

In a case which I have just operated the pulse after twenty-four hours remained about eighty and the temperature was from ninety-nine to ninety-nine and one-half; yet the tumor could be made out so distinctly that I knew a retro-cæcal abscess was forming. The pus in these cases is creamy and considerable in quantity, but is probably caused by a milder germ than the streptococcus.

The pain in the appendix is usually paroxysmal and if it becomes localized and intense it is very strong evidence. After thirty-six hours of such pain unrelieved by catharsis, ice coil, and a single hypodermic of morphia at the beginning, if the pain suddenly ceases there is strong suspicion of perforation or gangrene and operation must immediately follow.

It seems probable that the temperature must depend upon the character of the infecting pus. The temperature as a symptom alone, therefore, is not trustworthy enough to establish a diagnosis, nor is pain or tenderness, or vomiting, or any other one symptom. The only thing that can give one a rational idea of the state is the palpation of the abdomen, and the physical signs alone are a justification for operation. I have repeatedly heard surgeons say that it is better to operate early because the symptoms and signs vary so much that no diagnosis could be made without an incision. I would go so far as to say that no operation ought to be done unless the physical examination reveals the justification for it. I have often removed an appendix early in the disorder when there was no pus yet formed, and when the lymph exudate was not fully organized, yet the tension over the rectus muscle could always be felt and it was safe to go by the physical examination.

The tumor that is felt early is not necessarily pus. An enlarged and inflamed appendix with a little exudate about the head of the colon is quite sufficient to give evidence of a marked tumor. The only case that is not immensely better without operation as soon as this tumor has been found, has just been referred to as the catarrhal type that subsides, and the tumor disappears after the first twenty-four hours.

It seems to me that right here is a little bit of technical quibble that separates the medical from the surgical household. I do not think any difference need to occur if the diagnosis of the fulminating type could be made every time. It ought to be made every time by the medical man, and if he would cultivate his power of palpation and rest upon the physical signs mainly for a diagnosis of appendicitis and upon the progression of the symptoms for the indication that it is of the dangerous type, he will arrive at his point of operation within the first forty-eight hours, and often earlier. The surgeon, on the other hand, must consider that in many cases in which the physical signs of appendicitis are unmistakable, the symptoms are so mild that the family and the physician both hesitate to operate. This is very natural and it seems to me that a reasonable consideration should be given to the feelings of the family as soon as the case is taken out of the immediately dangerous category. If a mild sepsis continues for days it is folly to say that sweet oil or any other medicine will cure the case; and the sooner an operation is done the better it will be for the patient. After taking out the fulminating type of cases from consideration one can assure the family that there is almost no danger in operating, and in fact, there ought to be little, if any mortality.

But the responsibility of the medical attendant is not over when he says that it is better to operate, but that the case may possibly get along without it. The influence of prolonged sepsis, from any cause, upon the organs of the body is so dangerous, that this alone ought to make him insist that it is best to evacuate pus before the kidneys, the heart and the liver receive enough poison to jeopardize the patient during his entire life.

These are the reasons why operations should be done in those cases in which the physical signs persist and the symptoms show nothing but a mild septic infection. Every one knows that these cases sometimes clear up and after the third day the danger of rupture into the intestinal cavity is less than the danger of sepsis to the other organs, even if it runs on a week or two.

Persistent vomiting after an attack of colic which leaves tenderness in the abdomen never seemed to me to justify one in making a diagnosis of appendicitis, unless the physical signs were present. In that class of cases in which pus is being slowly formed and walled off, a dispute as to the necessity for an operation must frequently arise. If the patients are in such circumstances that they cannot be well cared for at home, or if they are far from a physician, then it is safer to delay until they can be taken to a hospital, or until a nurse can be secured, or a proper surgeon found, than it is to have an operation done by a rash man on the spot.

I saw such a case this spring in a girl of ten years of age who had been sick five days with appendicitis. It was in a small house remote from any physician, without a trained nurse, and without anything clean in the house or its surroundings. I refused to operate, though I had been summoned to do so, but advised that the child be brought to a hospital where the dressings could be properly made, for there was no doubt but that it was a pus case and would require considerable after care. I think the child would have died from inexperience on the part of her attendants had I operated that day. I operated a little later in a hospital and the child made a nice recovery.

I think the dangers of adhesions in these slow cases where the appendical abscesses form have been over-estimated. After an operation with thorough drainage continued for a long enough time to make sure that the exudate has all disappeared, in my experience they come out better for their work afterward, with less danger from intestinal obstruction than occurs in those cases of early operation where the abdominal cavity is opened and the inflammatory trouble is more diffuse and less localized. Up to this time the only cases that I have had to re-operate for intestinal obstruction have been cases where the appendicitis was of

the fulminating type and the operation had to be done early and the general cavity of the abdomen was, therefore, infected.

It ought not to be forgotten that in women where there has been a distinct history of acute appendicitis, the tumor may burrow down so as to obscure the physical signs over the seat of the appendix. These cases can easily be made out by a vaginal examination. I have opened many of them from below as I would a case of salpingitis. It is probable that this accident happens because the appendix is long and hangs down under or on the end of the broad ligament.

It is not probable that appendicitis is often caused by ovarian or tubal disease, while I am sure the converse is true. I have operated young girls for diseased appendages and found an adherent appendix as a cause in many cases.

Referring again to those cases of so-called catarrhal appendicitis in which the symptoms subside after the first twenty-four hours and do not immediately recur, what is the duty of the attending physician? Some very extreme views have been offered which could not possibly be borne out by any facts which are known at this time. We cannot say, for instance, that it is better to operate every such case in the interval, and that all such apparent cures are deceptive, and that they must ultimately come to an operation. If these well-marked attacks of catarrhal appendicitis recur two or three times lasting from three days to a week on each occasion, and the health of the patient is beginning to be impaired by the slight intestinal obstruction which causes these attacks, it is not only wise but it is necessary to operate in order to avoid very serious consequences. Not all first attacks, however, are followed by recurrences, and in these I think the medical treatment ought to be carried out with a definite plan for a long time. As soon as the symptoms and the physical signs have disappeared—say within two or three days after the beginning of the attack or even earlier—it is better to give a sufficient amount of pulpy food to keep the bowels somewhat distended and to promote peristalsis, in order to prevent adhesions from shortening enough to fix any part of the intestinal tract. It is the formation and retraction of these bands that produce the recurrence in many instances, and it is a mistake to leave the intestines empty. They ought not to be kept quiet by opiates.

I do not believe that the continual use of cathartic medicines as has been generally advised is of service. This may do harm. Soft boiled rice, well-cooked preparations of Indian meal, soft toast, and such like foods that do not undergo a putrefactive change ought to be given in abundance so that the stools will be

large and pulpy. If the soreness is gone after a week and there remains only a sense of pulling in the region of the appendix when the patient is standing, light massage practiced over the whole abdomen is useful.

It has been my custom in all cases of appendicitis after the bowels have been freely moved for the first time to give continuously an antiseptic for a week. This has usually been two grains of salicylate of cinchonidia with one grain of salol every two hours. After two or three weeks if there is no pain on deep pressure over the appendix, but if there still remains a sense of dragging and pain due to the bands of adhesions; or if there is intestinal irregularity showing that there is some fixation of a coil of intestines, then the application of a current of galvanism directly through the region of the caput coli, the current measuring three or four amperes and forty or fifty volts, will be of great service. This is applied two or three times a week for a period of ten minutes.

All that has been said regarding the after treatment of catarrhal appendicitis to prevent the recurrent attacks may be applied with equal force to those cases where interval operations have been made for chronic appendicitis, and where the adhesions are likely to reform. I have never seen any marked good from the use of sweet oil, though I would not condemn it. Such tonic medicines as help to perfect the act of digestion and also increase the peristalsis of the intestines, like the preparations of malt with strychnia or nux vomica, seem to me to be rational measures to follow unoperated catarrhal appendicitis, or to follow clean operations, for there is always danger from adhesive bands. I have seen electricity and massage relieve pain about the head of the colon following a clean appendicitis operation, where the tendency to slight obstruction of the bowels was well-pronounced, and where the contracting bands made the patient most uncomfortable.

I cannot go into the question of diet, but would like to say that well-cooked and properly digestible foods would in my opinion prevent the recurrence of slight attacks of appendicitis which often lead up to a serious or fatal termination.

### Discussion

Dr. Herman Mynter, of Buffalo: I have been asked to open the discussion upon the subject of the Medical Aspects of Appendicitis, and I shall do so by telling you that there is no medical aspect of appendicitis. We have changed our views considerably in recent years regarding this disease. Ewald says it will never be acknowledged that appendicitis is a surgical disease, but we do not live in Germany, and appendicitis is distinctly an

American disease. In many of the points raised by Dr. Ford, I agree with him, but not when he tells us that there are medical aspects of appendicitis.

In order to discuss any subject, or to understand how to treat any disease, two things are necessary: one is, that we must know the etiology, the other, the bacteriology. If we know those two things, we can treat a disease intelligently. We know that the appendix is of very low vitality; that it has a large absorbent surface, which absorbs the fluids and solids left behind. We also know that it contains a large amount of tissue which is easily inflamed by bacterial infection; that it may extend in different directions and be subjected to slight injuries; that it contains a bacillus which under very slight provocation may become virulent; that it may play a part in a number of different abdominal conditions; that it has only one artery and its circulation is easily cut off; that it is an organ which readily becomes inflamed.

With regard to the etiology of appendicitis we know that the disease is very apt to recur; that one attack predisposes to future attacks in almost fifty per cent. of cases. Personally, I believe that necrosis of the appendix may result from simple pressure due to enteroliths or something else, without the aid of bacilli, and I am convinced that every attack of appendicitis is followed by such serious changes that relapses are very apt to occur. I believe that every case of appendicitis originates as a catarrhal condition, and those are the very cases which the family physician is called upon to treat. The catarrhal inflammation is followed by structural changes in the organ, with stenosis and dilatation, and when the case reaches that point, recovery is impossible without operation. Otherwise, ulceration, gangrene, perforation and diffuse peritonitis will result.

In order to decide whether appendicitis is a medical or surgical disease, or has any medical aspect at all, there is nothing that compares to statistical exhibits. Statistics, as we all know, are often unreliable, but again, they are very valuable. We are told that the mortality of the disease under medical treatment is 20 per cent.; that is, 20 out of a hundred die under the medical form of treatment. I want to call your attention to the absurdity of such a statement; to collect 100 cases of appendicitis which were treated by medicinal means and compute a mortality rate therefrom. It is just as absurd as it would be to base the mortality of herniotomy upon 100 operations done by the Bassini method. The twenty cases of appendicitis which resulted fatally under medical treatment were the serious cases, while the remaining eighty would probably have recovered by keeping the patients quietly in bed, without any treatment. I have yet to see a serious case of appendicitis which was at all benefited by medical treatment. There is another point to bear in mind. Of the eighty which recovered, 50 per cent. will suffer from relapses, and a certain number of them will doubtless result fatally. The mortality of appendicitis under medical treatment, instead of being 20 per cent., is in reality from 65 per cent. to 75 per cent.

Dr. Robert T. Morris, of New York: Dr. Ford tells us that appendicitis is not as common in Europe as in this country. I think that is a point which has not been reduced to scientific data. Those of us who live in New York are frequently called upon to operate upon patients who have made the round of various "cures" in Europe, and whose trouble has been variously diagnosed as typhlitis, perityphlitis, cholecystitis, and so on, and

yet here we make the diagnosis of appendicitis and upon operation we find that the appendix was the real seat of the trouble. I have been through many of the European hospitals, and can recall many cases there which to my mind were undoubtedly cases of appendicitis, but which they called something else.

Contrary to the opinion expressed by Dr. Ford, I believe that the keynote of the etiology of appendicitis is compression necrosis. Whether we have a catarrhal condition of the colon, causing a swelling of the mucosa and strangling of the mucosa of the appendix; whether the appendix is twisted in its long axis; whether we have pressure from a concretion or other body, the result is the same, namely, compression necrosis. From whatever point of view we approach the subject, we arrive at the same conclusion, which gives us in a nutshell the chief cause in the etiology of appendicitis. I do not wish to imply that there is no truth in the supposition that the psoas muscle exerts some pressure upon the appendix. As a matter of fact, the psoas muscle does twist many appendices, and may be the cause of an attack of appendicitis.

The word "catarrhal" appendicitis is one of the most fatal words in our nomenclature: it is almost as fatal as gonorrhœal rheumatism. Two days ago I saw a case of fulminating appendicitis which had been diagnosed as catarrhal appendicitis. Four or five days ago, in a case of so-called catarrhal appendicitis, I found a large concretion in the appendix. I believe that every case begins as a case of catarrhal appendicitis, but I doubt whether it gives rise to any symptoms while it is in the catarrhal stage. When we have symptoms of appendicitis, I believe the case is past the catarrhal stage.

Dr. James Neil, of New York: I have listened with much interest to this paper and the discussion it gave rise to. Although I make no claims to being a surgeon, I know a little about surgery, and I do not agree with the statement which has been made that there is no such thing as a medical treatment of appendicitis. For many years I have resorted to a method of treatment in this disease which is not only successful, but wonderfully simple and at the same time rational. As soon as I am called to see a case of appendicitis, I immediately have the hips of the patient elevated as high as he can comfortably bear it. I then give him an injection of warm flaxseed or slippery-elm tea, which is done for the purpose of removing impacted feces in the cæcum. I keep him in that position as long as he can bear it and then let him lie on the right side. After having repeated this procedure a number of times, I then give the patient a large dose of castor oil, with peppermint.

Dr. B. O. Kinnear, of Clifton Springs: About two years ago I made 200 examinations of the blood as an etiological factor of appendicitis, and I found that where the blood was too rich, there is a tendency towards congestion and inflammation. In one subject this condition may give rise to brain trouble, in another to bronchitis, in a third to catarrhal trouble, and in that way it seems to me that it may be an etiological factor in appendicitis. The very word "appendicitis" implies an inflammatory process, which, in my opinion, in its early stages, may be properly treated by medical measures, the same as we treat inflammation of the serous membranes elsewhere in the body.

Dr. Bond Stow, of New York: I am a physician and not a surgeon, and in the earlier years of my professional work, I was in favor of treating appendicitis from a medical standpoint, and advise operation in only exceptional cases. Since then, however, I have made a careful study of the pathology of the disease, and I have become convinced that in every case of appendicitis the physician should advise with the surgeon at the earliest possible moment.

Dr. Homer Wakefield, of New York: Most of the works upon appendicitis deal with the surgical pathology and treatment of the disease. We know very little of the physiology of the small intestines, but the more recent advances made in that field hold out some hope that we will soon be able to discover the true etiology of appendicitis. We know, from recent observation, that the bacteriology of appendicitis is not uniform, and I am inclined to believe that the true etiology of the disease will be found in the line of chemical pathology. In a study of this subject embracing a large number of cases I have found an excess of organic acids in the cæcum and about the orifice of the appendix, and I am led to believe that they are largely acid formations which are emptied into the cæcum by the small intestine. I readily recognize the fact that after an inflammation of the appendix has reached a certain point, it becomes a surgical condition, and we must look entirely to the surgeon for its cure, but up to that time, both in prophylaxis and in treatment, the physician must be looked to to relieve the hyperacidity of the small intestines.

Dr. Ford: (Closing the discussion). My paper was confined to a single phase of appendicitis. I do not wish to raise the question as to whether surgery or medicine owned this disorder. I have heard that question threshed out so often that I had no intention of bringing it up again to-day. I simply wished to emphasize the point that there are certain medical facts in connection with appendicitis that should be well understood by the general practitioner, into whose hands these cases first come. Until the surgeon is called, it is entirely proper that the medical man ought to have certain well-defined ideas of what he should do. I do not agree with the statements made that a knowledge of the pathology and bacteriology are the most important things to learn in the treatment of a disorder. There are other things quite as important, and even more so. We must look to the medical man, not only in the early stage of appendicitis, but also in connection with its after-treatment. The prevention of adhesions after operation is a very important matter; if we accomplish this, we have done much toward insuring the safety and comfort of the patient, because a man is never quite as sound after abdominal section for appendicitis, whether the case was a clean one or whether there was pus.

# LIII. THE IMMEDIATE REPAIR OF INJURIES OF PARTURITION

By A. L. BEAHAN, M. D.
CANANDAIGUA

The violence done to the genital tract by the act of parturition should be remedied at the earliest possible moment. The great school of plastic surgery originated in this city [New York] and the great teachers, Sims, Emmett and their followers placed womankind under lasting obligation to the scientific skill that brought certain benefit to the conditions caused by a pathological labor. It is a pity that the work of this school has not more devoted followers. It was perfect enough to be classical and no flap-splitting suspending intra-abdominal operation or ligament-shortening method can take the place of the operations exemplified and perfected at the Women's Hospital in this city. The principles taught were correct and were the honest interpretations of the needs and limitations of the work. This was from the standpoint of the gynæcologist and was to meet the consequences of neglect and long suffering conditions. The farther away from the occurrence of lacerations of cervix uteri or perineum the time for repair was placed the less successful was the result and the more strenuous the criticism of the Emmet operation, especially of the perineum. From the standpoint of the obstetrician the operative technique is that of the beginning of mischief, not its consummation. There is not a general descensus of organs with consequent interference with circulation and the congestion following. There are not urethrocele, rectocele and an elbowing into the vagina of the rectum with their consequences. There is not cervical hyperplasia or a spool of cicatricial tissue at the old lacerated angle of the wound. The condition is simply one where from sudden dilatation tissue is torn, its continuity violently broken. The cause may occur as the result of an inherent spasm of muscles or their deterioration due to the incident of conditions associated with a higher civilized life. It is not to be presumed that any obstetrical skill can avoid the laceration of parts when such a condition underlies the cause, in fact in the lacerations of the lying-in women it should not be considered an opprobrium that they do obtain in the hands of the accoucher. The ability to diagnose lacerations and to make repairs that shall restore the parts to their original integrity far outranks the ability to demonstrate by statement alone that any practitioner

has had such and such a number of confinements with no lacerations. It is extremely doubtful if in the majority of labors severe abrasions, contusions and solution of continuity of tissue do not occur. Every case should be inspected in a good light, preferably upon a table that the eye may assist the tactile sense in determining the facts. Nothing should be left to chance or inference. Gynæcology may lose by this teaching, but obstetrics, the leading science of the two, will gain its true position. It is often easy to gain the consent of the patient and parties interested immediately following severe labors for such repair as is indicated. It is not easy to obtain the privilege of later operative procedure and the proneness of women by nature to cover their troubles militates against their interests in this respect and when the question becomes a gynæcological one, different principles of correction are often applied and sometimes the effort is at least a partial failure.

As to the perineum, the injuries from parturition are of varied degree from nicks of the anterior portion of the vulva to laceration of parts, including the so-called perineal body and the contiguous sphincter muscles through the rectum. Lacerations may occur in any or several directions. Their immediate effects are increase of discomfort and danger from an invited sepsis. The tears are direct. The separation of muscles on lateral walls forming the rectocele comes later. The normal rectum follows the curve of the sacrum and fæcal matter is ejected forward. The elbow of a rectocele gives a forward bend into the vagina and the normal rectal current is reversed. This does not occur at once after a laceration. It is a consequence of neglect of repair. The method of suturing a laceration is from above down and from within out and the uplift of tissue toward the tuber ischii, though not so intensely essential as is the repair of old lacerations will do no harm. We prefer silk worm gut well shotted because softer material cannot be kept as tense, and does not continue aseptic. A continuous suture of silk worm gut shotted at either end applied within the rectum may be used in rectal tears, or the interrupted silk suture. The ends of the sphincter ani muscle must be sought and approximated. Dead spaces must be carefully avoided. Criss-crossing of sutures will cause a sinus. The use of a Peaslee needle from the outside alone is, says Emmet, only as useful as sewing together the drawers below. If the skin were never approximated and the inner parts placed in apposition, the operation would be anatomically a success. The posterior vaginal wall must be made to fit the curve of the anterior vaginal wall very closely. No speculum should be used, except for in-

spection, especially after the sutures are placed. A wide Sims speculum will not allow the parts to come together properly. The removal of sutures of the perineum should be contemplated at the end of two weeks and should also be effected gently and without specula.

The repair of the recently lacerated cervix should become as popularized as that of the perineum and both should be pushed forward in professional esteem.

The paucity of literature on early repair of cervical laceration and the small amount of work done in this direction is surprising. It is probable that one reason for this condition of affairs lies in the appearance of the cervix immediately succeeding labor. An œdematous, misshapen, frilled opening with no semblance to a normal cervix presents. It will be much changed in 24 to 48 hours, and, in my experience, both cervix and perineal tears should properly wait for at least this period and with as good results as if repaired immediately. Manual compression of the uterus and the use of ergot are to be conjoined and the uterus contracts greatly and placing the patient on a table in a good light with the uterus cleared of clots, a mild antiseptic douche being used, as when the placenta is removed after miscarriage or abortion. With the supplementary use of a large dull irrigating curette, when necessary, it is a gratification to see the uterus contract firmly, the cervix presenting a greatly improved appearance and the work begins with every problem well in hand. The Sims speculum and the dorsal lithotomy position may be used, though it is better to draw the uterus well down with volsella or tenacula and make the operation practically outside the body. The sutures should be placed as in the Emmett gynecological operation, that is in V directions, that the tissue may be drawn upward and the last suture passing into the presenting edge of laceration prevents the formation of a nick in the restored cervix. Silk worm double shotted sutures are best and these may be left for any considerable length of time, as from two to four weeks, without harm if a careful aseptic toilet is maintained. If the care of these cases falls much below a good standard, only a partial success can be hoped for, while with proper care a poor operation will yield satisfactory results. The benefits of the operation are prevention of subinvolution, lessening of infection, avoidance of reflex caused by cicatricial tissue at the point of healing and its associated anæmia, destructive changes in fibrous and muscular tissue of cervix and endometrium by chronic inflammation, according to the known law that fibrous tissue when inflamed hypertrophies and contracts and muscular tissue when irritated gives fibroid degeneration and atrophy.

Dr. R. M. Moore, of Rochester, N. Y., in a recent paper before the Rochester Pathological Society, gave the result of operative work in immediate repair of cervices and cited the results of Dr. Baldwin's work in the same direction in that city. It was the consensus of opinion evidenced in the later discussion that the operation should have a brilliant future. The results in the hands of these operators were satisfactory. The operations done in the series of cases reported, indicated that from twenty-four to forty-eight hours might profitably and preferably elapse after confinement before restoring the parts to their normal relations. The same thought and plans should be given and devised as for any other surgical work with sufficient help and simple, direct, clean technique.

The popularizing of cervix repair is much advanced by free discussion of its merits. The repair of the perineum was early criticised severely. It is not safe to watch lacerated cervices for possible malignancy. It is bad surgery. Emmet says 95 per cent. of perineal lacerations repaired early are cured and the other 5 per cent. fail from poor nursing. The same rule holds more eminently in the case of recent tears of cervix because infection cannot come from rectum and external sources. Parturient injuries of every kind should have immediate attention. It is a crime to not restore the vulva and cervix to perfect anatomical structures. A gaping vulva, wide vagina and everted os, mean invalidism to women. Approximation of parts is all that is required. The sutures will hold if the simple, half-curved needle with small cutting point is used and the scythe-like Hagadorn is not employed. Grasp plenty of tissue and do not bite it hard. The silk worm suture never fails in its work. A heavy pair of forceps that will crush a shot, one or two tenacula and scissors with a Sims speculum, shot and sutures, are all the necessary instruments and appliances needed for the work. Use an anæsthetic, have good light, and, if possible, good assistance, especially a clean nurse, who will keep the parts clean, and an Emmett result is assured. The prevention of the accidents and sequences of child-bearing, thus removing the reproaches cast upon the obstetrician by such measures as shall restore all the parts of the parturient canal to their original integrity, is demanded. There is no more important work to be done for child-bearing women by their physicians, none more easy if the proper principles are applied in the best way.

### Discussion

Dr. Charles Jewett, of Brooklyn: The general opinion is opposed to the immediate repair of cervical lacerations. The reason for this is the

great danger of infection. There is no time during the parturient period that infection may more easily occur, as the wounds are wide open and the resisting powers of the patient are at a minimum. I would only resort to immediate suture of the cervix in those cases where it is necessary to do so to control hæmorrhage.

Lacerations of the pelvic floor may be sutured at any time before cicatrization begins, providing the wound is aseptic. I have sutured the pelvic floor at all times up to the end of the tenth day and even later with entire satisfaction. If necessary, the surfaces of the wound may be vivified by rubbing them with cheese-cloth, or they may be brought together without this. Late repair of the pelvic floor has some advantages, as, for example, the absence of hæmorrhage which obscures the field of work, and the ease with which the relations of the parts can be made out. Late repair is particularly advantageous for the inexperienced operator. Furthermore, in a certain proportion of cases, where the woman is very much exhausted, immediate suture should never be undertaken. I have seen death occur from attempts to do too much at such a time. As a rule, however, these lacerations can be repaired without delay. The levator ani muscle consists of bundles of fibres, none of which cross the median line, as is sometimes assumed. The injury which takes place in a tear is a separation of this attachment. Accordingly, we find that the incomplete tear extends up into one or both vaginal sulci. The repair, therefore, should be directed accordingly. It consists in closing this single or double cross-shaped tear in the sulci, which is all we can gain in an ordinary, incomplete laceration. The external parts have little or nothing to do with the strength of the pelvic floor, but still they are closed for cosmetic purposes and to prevent infection. As regards the kind of suture to employ, I prefer the chromic catgut, which holds as long as is necessary and does not require subsequent removal.

Dr. M. C. Potter, of Rochester: I am convinced, from my experience, that immediate suture of a lacerated cervix is much more difficult than when the operation is done at a later period. More recently I have followed, with much satisfaction, the plan of waiting twenty-four hours, and then doing the operation after giving the patient a hot intrauterine douche. By this time we usually find the cervix pretty well shaped down, and the parts can be brought into more perfect apposition. I think this is better than to leave the woman with a large exposed wound surface. I consider it important that the laity should be educated up to the point of expecting and desiring these reparative operations after labor.

Dr. Beahan: In reply to the statement made by Dr. Jewett that repairs of the cervix should be postponed because of the fear of infection, I would say, that there is no more danger of sepsis from the cervix than from the perineum, and the repair of the former should be as early and complete as that of the latter. The danger of sepsis is diminished rather than increased by closing cervical lacerations without delay. There is no condition in surgery where an open wound should be tolerated, providing it can be made aseptic.

# LIV. REMARKS ON THE DIAGNOSIS OF PREGNANCY IN THE EARLY MONTHS

By CHARLES JEWETT, M. D.
BROOKLYN

The best evidence of utero-gestation at whatever period is to be sought in the characters of the uterine tumor. These pertain in part to the uterus itself and in part to its contents. In the first weeks of pregnancy the ovum occupies a relatively small portion of the uterine cavity. By the end of the third month it wholly fills it. During the greater part of the first trimester the properties of the uterine tumor which appeal to the examining fingers as evidence of pregnancy are wholly or mainly those of the uterus itself, changes superinduced in it by the physiological process going on within. Toward the end of the third month and from that time on palpation is in great part addressed to the ovum as felt through the softened and thinned uterine walls. Soon after the time when the ovum begins to fill the entire uterine cavity the principal indications of pregnancy are what may be termed the fœtal signs, such as fœtal parts, passive movements, active movements and fœtal heart tones. Obviously the changes in the uterus incident to early pregnancy do not become sufficiently marked to be distinctly appreciable by the touch within a period of several weeks, usually not much before the sixth. Some of them are obscured or lost when the uterus becomes distended by the product of conception.

During the larger part of the first three months, the structural changes in the uterus itself constitute almost the only reliable objective evidence of pregnancy and some of these changes are sufficiently marked to be available for diagnosis only between the fifth and the tenth week or a little longer.

The object of this brief paper is to consider the more valuable signs of pregnancy at this period as elicited by the bimanual examination of the uterus with special reference to certain facts that have not been sufficiently emphasized by obstetric writers.

All the diagnostic properties of the uterine tumor which appeal to the touch in the first three months relate to size, shape and consistence; they may be tabulated as follows:

Softening of the cervix.

Size of the body and progressive growth at the rate of pregnancy.

Extreme compressibility of the isthmus, Hegar's sign.

Relative density of the median and lateral sections of the isthmus.

Asymmetry and differential density of the body.

Density and shape of the body as a whole.

*Changes in the Cervix.* The structural changes in the cervix are not sufficiently pronounced to be of much diagnostic value before the end of the second month. Beyond this period they soon become so. They may be absent, however, during the early months in the presence of cicatricial tissue and may be simulated by metritis in the non-gravid uterus.

*Differential Density of the Isthmus.* A characteristic of the isthmus uteri which was utilized by the writer for the diagnosis of utero-gestation before the publication of Hegar's sign is a more pronounced softening of the central than of the lateral sections of that segment. In the gravid uterus within the period with which we are dealing the middle portion is less dense than are those on either side of it. This change in the differential density is generally well marked by the fifth or sixth week and it is at least not inferior in diagnostic value to Hegar's sign.

The difference in the relative density of the median and lateral sections is doubtless due to the presence in the former of the thick soft decidua. From the fifth to the eight week the thickening of the decidua is about equal to that of the uterine wall. In the gravid uterus, therefore, the isthmus is less resistant to the touch within this area than in the lateral sections where no decidua intervenes between the examining fingers.

Relative softening of the median section and compressibility throughout the entire width of the isthmus are not obliterated during uterine contractions.

*Hegar's Sign.* Generally when clearly defined Hegar's sign may be regarded as absolutely diagnostic. With extremely rare exceptions no pathological condition counterfeits it. While it is true, as certain writers have affirmed, that some degree of compressibility of the isthmus may be present in those very rare conditions, hydro-and hematometra, it is not typical. It is not so well defined in proportion to the size of the corpus as in the gravid uterus of similar dimensions. The body of the uterus, too, is more nearly globular than in gestation and it presents the characters of a tense cyst.

In a single instance in the writer's experience Hegar's sign was found perfectly developed in a case of puerperal metritis. Unlike certain other observers he has never met with anything closely resembling it in other forms of metritis.

This sign may be looked for after the fifth week. Unfortu-

nately in a small proportion of cases, perhaps 10 per cent., it cannot be detected even as late as the eighth.

In many women the difficulties of the bimanual examination make this sign of little or no value. Sometimes in such cases it may be elicited by the recto-vaginal method, the uterus being well drawn down with traction forceps. In any case failure to find it is not conclusive.

Yet Hegar's sign is by some writers given first rank among the earlier evidences of utero-gestation. My own estimate is that while it is not inferior when fully made out to any of the other signs of the early months, its practical value is less than that of the shape and consistence of the corpus for the reason that it is not so readily appreciable.

*Differential Density of Corpus.* Another indication of pregnancy at the period in question is the differential density of the uterus. (Dickinson, Braun, Hübl, Winter, Schauta and others). The impregnated ovum lodges in the uterine mucosa most frequently at a point near one cornu. So long, therefore, as it only partially fills the cavity of the uterus, the corpus presents an asymmetrical shape. That horn or that lateral segment of the body of the uterus, too, which contains the growing ovum is denser to the examining fingers than is the other. A longitudinal sulcus may be made out between the thicker and the thinner cornu upon either the anterior or the posterior wall, or both, and it may extend over the fundus.

Braun has sometimes been able to recognize the difference in size and density of the two halves of the gravid uterus within a few days after the first skipped period (Trans. Vienna Obstet. and Gyn. Soc., Centrbl. f. Gyn., 23, No. 17). The difference in consistence of the two lateral segments he has generally found most marked upon the anterior wall.

He thinks the longitudinal sulcus may, like Hegar's transverse fold of the posterior wall, be an artificial product, the result of irritation incident to the bimanual examination.

He calls attention to the possible utility of these signs in deciding whether the ovum has been expelled in abortion, and in the diagnosis of early ectopic gestation.

Hübl induces contraction of one-half of the uterus by massaging one horn. This density of the opposite half remains unchanged. This difference in the consistence of the two horns developed by manipulation is characteristic of pregnancy. Such irregular contraction cannot be induced in metritis.

Schauta alluded to the irregularity in the shape and density of the gravid uterus in the report of his first thousand laparotomies. In one case he had operated under a mistaken diagnosis

of ectopic gestation, the uterus having assumed a marked bicornuate shape owing to the presence of an ovum in one horn. In the experience of both Schauta and Braun one segment of the gravid uterus has been found so tense and hard in comparison with the other as to lead to the erroneous diagnosis of myoma.

*Shape and Density of the Corpus.* Most easily available of the signs obtainable in the early months by the bimanual examination are marked softening and lateral expansion of the body of the uterus, and it is especially to these peculiarities of the gravid uterus in the early months that it is desired to direct attention.

An apparently almost jelly-like consistence of the corpus together with a width often two or three times its antero-posterior thickness makes the diagnosis of utero-gestation. The softening may be so great that it is only with difficulty that the borders of the upper segment can be mapped out by conjoined manipulation. In no other condition than pregnancy is the softening so marked. This character alone when pronounced may safely be taken as proof of normal gestation. No pathological condition counterfeits it. As already stated it is only partially developed much before the fifth or sixth week. Again, it disappears toward the end of the third month, owing to distension of the uterus by the growth of the ovum. Between these two periods there is no other evidence of pregnancy which equals in diagnostic value softening, antero-posterior flattening, and consequent broadening of the corpus.

It must be remembered, however, that both these conditions disappear during uterine contractions. They are available, therefore, only when the uterus can be caught between contractions. Repeated examinations at short intervals may be necessary. When the uterus is not primarily contracted it soon becomes so under manipulation. During contraction the shape and density are entirely changed. The width of the uterus is less, the density is greater, though not so great as in the nongravid state, the body assumes an irregular ovoid shape, the anterior wall presents the form classically described as that of a pot-bellied jug.

Upon the latter characters which are presented only by the partially or firmly contracted uterus much stress laid in the text books. Yet, they are inferior in diagnostic value to the peculiar softness and great transverse width of the corpus which characterizes the intervals between contractions.

*Pregnancy Complicated with Myoma.* The presence of myomatous growths seriously complicates the diagnosis during the period contemplated in these remarks.

An œdematous fibroid in the uterine wall may closely simulate

pregnancy in so far as relates to the characters of the uterine tumor.

On the other hand a gravid may be mistaken for a myomatous uterus if palpated during the height of a contraction. This mistake has frequently been made by surgeons. Here Hegar's sign and the diminished resistance of the median section of the isthmus may serve to differentiate. Both are present in nearly all cases of uncomplicated utero-gestation by the end of the sixth or seventh week. They are absent in the non-gravid myomatous uterus.

These signs may be utilized during operation for confirming or disproving the diagnosis when the abdomen has been opened for a supposed myoma. Obviously the isthmus uteri may be interrogated with more ease and certainty through the abdominal incision than by the usual clinical examination.

In pregnancy coexistent with interstitial myoma these changes at the isthmus will seldom be found. Their presence or absence in the pregnant myomatous uterus will depend on the situation of the morbid growths. When they do not involve the isthmus the same changes may be present in that portion of the uterus as in uncomplicated gestation. Yet the bimanual examination of the uterus for pregnancy is greatly embarrassed by large myomata in any situation.

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## LV. OBSERVATIONS ON THE TREATMENT OF CROUPOUS PNEUMONIA

By JAMES C. WILSON, M. D.
PHILADELPHIA

Nearly half a century ago Trousseau, the greatest clinician of France since Laennec, wrote these words: "Pneumonia is not uniform in character: the forms which it assumes, its greater or less intensity and extent—the influence of the prevailing medical constitution—the personal specialties of the patients in respect to age, sex, temperament and previous health—the disease which may complicate pulmonary inflammation, and the unfavorable conditions which may supervene during its course—all demand particular inquiry on the part of the physician. He must take special account of all of them, for they greatly modify the disease, and are also the source of much diversity in the therapeutic indications."[1] Since that wise utterance medicine has made an enormous advance. Pathology has become a science of definite facts; bacteriology has not only come into

existence, but also has assumed in the brief period of its existence leading importance in etiology, diagnosis and treatment. Therapeutics itself has undergone many revolutions and made some advance, but the facts observed at the bedside remain the same—the chill and high temperature, the stitch in the side and dyspnea, cough and rusty sputum, the short course, the critical defervescence, the rapid convalescence of classic pneumonia are the same now as then. The high mortality in certain localities and years, the comparatively favorable course elsewhere and in other seasons, the resistance manifested in early adult life, the helplessness of the senile, the unfavorable influence of previous disease and alcoholism, the disastrous effects of complications, the fact that croupous pneumonia is the terminal event in many chronic diseases and in most healthy persons of advanced age, and that there are occasional exceptions to all these general statements are familiar and abiding truths. The uniformity of the symptom-complex in well developed frank pneumonia is no less remarkable than the diversity of its manifestations in cases of aberrant type. Our dismay at the sudden death of a youth who has apparently been doing well, in consequence of an extension of the exudate or an overwhelming toxemia, is no less than our delight at the unexpected favorable termination of the attack in an aged person. These facts are not only the cause of much diversity in the therapeutic indications; they are likewise the cause of a most bewildering diversity and perplexity in the therapeutic conclusions. Thus Petrescu, after an experience of thirteen years with enormous doses of infusion of digitalis in a series of 1,192 cases, reported a mortality of 2.66 per cent.—while 500 cases from the recent records of the Pennsylvania Hospital, May, 1897, to August, 1901, treated upon expectant-symptomatic methods, showed 125 deaths—25 per cent.[2] Are we to conclude from the comparison of these figures that the treatment of pneumonia with large doses of digitalis, which created such excitement when first announced, is so much more efficient than the expectant-symptomatic plan, or that this difference in the result is to be explained by difference in the treatment alone. Let us look at the facts in the light of knowledge of the clinical course of the disease and the mortality under different conditions. The observations of Petrescu were conducted in the Military Hospital upon selected cases—young, strong men in previous good health, living under proper hygienic conditions and free from alcoholism. The cases of the Pennsylvania Hospital occurred in persons of that class who seek such an institution only from necessity, many of whom were actually destitute, others overworked, badly nourished, some in previous poor

health, aged, tramps and addicted to alcohol. Of 34 of these cases known to have been drunkards, 23 died—a mortality of 67 per cent. The analysis of the results according to age is especially striking: the largest number of cases, namely, 136, occurred in the third decade of life with 25 deaths—a mortality of 18 per cent.—the smallest number one case in the ninth decade. This case terminated fatally. But the mortality by decades with, however, a decreasing number of cases after the third, was in the fourth decade 26 per cent., in the fifth decade 43 per cent., in the sixth 53 per cent., in the seventh 77 per cent., in the eighth 66 per cent. Among the occupations, 122 of the patients were laborers with 42 deaths—a mortality of 34 per cent., 8 were teamsters with 4 deaths—a mortality of 50 per cent., and 13 stevedores with 6 deaths—a mortality of 46 per cent. The frequency with which teamsters and stevedores are addicted to alcohol is well known, and a large proportion of hospital patients who describe themselves as laborers are given to excesses. Furthermore many of those who follow such occupations suffer from chronic bronchitis, emphysema and forms of myocarditis as the result of habitual exposure and overexertion. Finally a small proportion of hospital patients are admitted in articulo mortis and a considerable proportion practically moribund. It thus becomes evident that personal factors must to a great extent account for such differences in the mortality rather than treatment alone. In point of fact, Aufrecht saw in 377 cases of pneumonia in patients seeking a hospital from necessity, treated without digitalis, at an age between 5 and 20 years, 11 die—a mortality of 2.64 per cent., and Riessell in 127 persons between 20 and 30 years of age only 2 deaths—a mortality of 1.8 per cent., without digitalis. Pel, of Amsterdam, in a recent article on "The Treatment of Croupous Pneumonia Critically Considered,"[3] from which I have drawn many of the facts in this paper, concludes that "although the admirers of the digitalis therapy furnish cases of pneumonia which have recovered after large doses of digitalis, they have failed to prove that it was just this heroic use of the remedy which caused the favorable termination," and adds that it might be maintained with equal right that the pneumonia was cured in spite of these doses.

Croupous pneumonia more than any other disease demands very large series of cases to establish the efficacy of any line of treatment, and since this disease occurs under such varying conditions, each of which modifies alike the course of the attack and the mortality, it demands large series of cases submitted to the same treatment under similar conditions of age, occupation,

previous health and the like—conditions not likely to be fulfilled and not yet complied with in any disease except in the bath treatment of enteric fever.

It would appear that 75 per cent. of all cases of pneumonia admitted to hospitals recover and that in selected cases such as occur in military hospitals, namely, healthy young subjects, the death rate is much lower and in limited series of cases may be as low as 2 or 3 per cent. The mortality is also light in private practice. This diversity in the death rate has given rise to false conclusions as to the result of various plans of treatment. Aside from such errors conclusions equally false have been drawn from reasoning by analogy. In a recent authoritative publication[4] it has been assumed that full doses of mercurials and other germicides may favorably influence the course of the attack by rendering the exudate an unfavorable culture media for the pneumococcus, especially if administered too early. In regard to a specific treatment Pel calls attention to the fact that we only know four infectious diseases in which we are able to meet the causal indication. Malaria we can control by quinine alone; syphilis only by mercury and the iodides; rheumatic fever only by the salicylates or analogous substances; diphtheria only by its antitoxine. It would be a remarkable fact if croupous pneumonia—a disease due to a specific micro-organism, should yield to treatment by a number of different drugs selected to meet the cause, as the salicylates, iodides, quinine, mercury, creosote and carbolic acid. Nor does it seem desirable to repeat the futile experiments already made in regard to pulmonary tuberculosis, scarlet fever and other acute infections. The effect of indifferent antiseptics and germicides upon parasitic micro-organisms must bear a definite relation to the mass of the circulating blood in which they are diluted and which may be roughly estimated as from 12 to 14 pints in the adult. Experience has shown in regard to these drugs that the parasite is fully as tolerant of their action if not more so than the host. The dictum of Talamon in regard to tartar emetic holds good for other poisonous drugs: By their use we diminish the prospect of cure since we complicate the disease with the effects of a poison. With specifics like quinine in malaria the case is wholly different. In croupous pneumonia it is probable that the pathological process is fully established upon the occurrence of the chill and that the pulmonary lesion is far advanced before a positive diagnosis can be made. The pneumo-toxines produce the initial chills, the fever and the prostration.

Aufrecht's advocacy of quinine[5] has recently excited much interest. This observer's statistics, extending over a period of

ten years, show that during the last two years under quinine treatment the mortality fell to 6.6 and 8.2 per cent., although in former years it fluctuated between 9.8 and 25.3 per cent., and even grew to 24.9 per cent. during the year that preceded the quinine therapy.

As Pel has shown, the favorable effect of the use of such drugs as indicated by the mortality statistics is more apparent than real, since wide variations in short series of cases are constantly encountered. This critic calls attention to the fact that the period of observation—two years—is much too short and that the figures are much too small to justify conclusions in regard to the efficacy of a mode of treatment. Nevertheless, notwithstanding these objections, it must be conceded that thoughtful researches in the direction of specifics are justifiable.

Clinical experiments with antipneumococcus serum have not yielded satisfactory results. My own observations in the German Hospital with 36 cases treated with antipneumococcus serum showed 10 deaths—a mortality of 28 per cent. The collected cases of Tyler, of Denver, combined with my own number, 162, of which 135 recovered and 27 died—showed a mortality of 16.6 per cent. Our observations in the service of the German Hospital have not encouraged us to continue the treatment of croupous pneumonia by the use of antipneumococcus serum. Nor have our experiences with hydro-therapy been more satisfactory. This method of treatment was instituted some years ago upon a series of selected cases. Neither the effects upon the immediate course of the disease nor upon the mortality were such as to justify its continuance. Statements occasionally made to the effect that quinine with aconite or veratrum viride employed before consolidation has taken place "has the power of so modifying the hyperemia in the affected area as practically to abort the local process and prevent exudation" are mere assumptions, wholly without the support of statistical or other facts. There are those who appear to believe that croupous pneumonia can be aborted by various forms of treatment. During the first half of the nineteenth century the denial of the efficacy of abstracting blood in pneumonia would have seemed to the majority of practitioners of medicine the denial of a demonstration. At the present time there are those to whom the denial of the efficacy of calomel, quinine, cardiac depressants and the like arouses the taunt of therapeutic nihilism. But their number is few. The great majority of practitioners at this time advocate an expectant-symptomatic method of treatment. This was the plan advocated by Dietl, Niemeyer, Bourgeois and other leaders of the reaction against indiscriminate venesection. It was practically

the plan taught by Flint. It is advocated by Pye-Smith in the admirable article on pneumonia in Allbutt's System, who says: "In the long run the expectant method of treatment, which interferes only as occasion requires, is followed by a far lower mortality than misplaced attempts to jugulate the disease or than a completely negative treatment." Osler says: "Pneumonia is a self-limited disease which can neither be aborted nor cut short by any known means at our command," and again, "There is no specific treatment for pneumonia. The young practitioner may bear in mind that patients are more often damaged than helped by the promiscuous drugging which is still only too prevalent," and Pel, to whose article I have so often referred: "The less the physician interferes with the normal course of pneumonia, the greater the probability of a favorable termination."

The plan pursued in my service at the German Hospital in Philadelphia may be briefly outlined as follows:

The diet consists chiefly of milk and light broths. Junket, custard and like gruels are given if the patient cares to take them. In private practice a little ice cream and sometimes raw or stewed fruits may be given. Grapes are often acceptable. All these things are given in small amounts. If the patient will take from one to two pints of milk and a pint of chicken or mutton broth each twenty-four hours it is regarded as sufficient. Water is given in abundance, not more than 2 ounces at any one time. Under ordinary circumstances the patient is sponged night and morning with water, the temperature of which is regulated by his sensations. If the temperature exceed 104° F., cold sponging may be repeated at intervals of two or three hours. Early in the course of the attack two or three large, flat ice-bags are applied to the affected side. These to some extent relieve pain and make the patient feel more comfortable. They have a slight effect in reducing the temperature, but none whatever upon the extension of the exudate or the course of the attack. Alcohol is given in a majority of the cases. Ordinarily the amount does not exceed four or six ounces of whiskey in twenty-four hours. Larger quantities are given to those accustomed to its use.

A calomel purge is commonly administered at the time of the admission of the patient to the ward. If there be nausea and vomiting calomel is given in fractional doses. In the absence of these a single laxative dose is administered. If necessary, a saline is subsequently given. The calomel is frequently repeated once or twice during the course of the attack. If there be great pain, morphia is administered hypodermically. In any case Dover's powder, usually in the form of tablets of two or three grains, is administered every two or three hours throughout the

greater part of the course of the attack. The dose of this medicine is so regulated as to produce a slight continuous drowsiness, from which the patient may, however, be readily aroused. By this means suffering is diminished, cough is to some extent controlled and the excitement and apprehension common in pneumonia are allayed. No evil effects have been attributed to this use of opium. Toward the close of the attack Dover's powder is given with diminishing frequency. Expectorants are rarely employed. Fresh aromatic spirit of ammonia and the ammonium carbonate are sometimes given. If they do no good, they have never appeared to do harm. Aconite and veratrum viride are never given, and digitalis only in response to particular indications. If the pulse becomes small and frequent, especially if it becomes irregular, digitalis is sometimes given in full doses, not because the patient is suffering from pneumonia, but on account of the condition of the heart. In many cases strophanthus has answered a better purpose. As a rule strychnia is given as a cardiac stimulant and the nitrites, especially nitroglycerine, for the relief of the laboring right ventricle. These measures failing with increasing signs of failure of the right heart, the development of small mucous rales and cyanosis, venesection is practiced. If pulmonary edema occurs, atropine is given hypodermically and many times has seemed to avert the fatal issue. Dyspnea is regarded as an indication for the use of oxygen, care being taken that in the administration it is freely diluted with air. Nervous symptoms and delirium are to some extent controlled by the systematic administration of Dover's powder. They demand an increase in the quantity of alcohol. Ice to the head, cold sponging or the cold pack are useful, and in young robust individuals delirium tending to pass into coma is treated by cold affusions to the head and neck, repeated at intervals of three or four hours. These are often followed by marked improvement. Neither poultices nor cotton jackets are allowed. The patients wear a moderately heavy, loose-fitting, merino undershirt. Blisters are not used save in the case of delayed resolution, when a series of small flying blisters is sometimes applied. At the crisis the patient is carefully watched. If the Dover's powder has been discontinued, a hypodermic injection or an opium suppository is administered. In some cases ammonium carbonate, alcohol or hot coffee appears to be indicated. Collapse is very rare. During convalescence an abundant nutritious diet is given. The patient is permitted to have meat as soon as he desires it. Bitter tonics are employed in some cases and we are in no great haste to yield to the patient's wish to get out of bed.

I do not speak of the treatment of complications. The prognosis of pneumonia in ordinary hospital cases must always be guarded. The statistics of the German Hospital under this plan of treatment are not satisfactory; the figures for the last five years are as follows, but on the occasions in which we abandoned it for systematic cold bathing and serum therapy our results were still less satisfactory.

| | No. of cases treated. | Deaths. | Per Cent. |
|---|---|---|---|
| 1896 | 12 | 7 | 58.3 |
| 1897 | 48 | 13 | 27.0 |
| 1898 | 36 | 18 | 50.0 |
| 1899 | 48 | 21 | 43.75 |
| 1900 | 42 | 9 | 21.43 |
| Total | 188 | 68 | 36.50 |

These figures do not indicate the result of treatment but show the intractable character of the cases admitted to the service, the high mortality of the disease in a general hospital and the great variation in the mortality in short series of cases in different years.

### Discussion

Dr. S. B. Ward, of Albany: There is no question that our experience has shown that the epidemics in different years differ from each other very decidedly. There is also a decided difference in the results obtained in the hospital and in private practice. The result in a case of pneumonia depends largely upon the previous habits of the patient. I have had no success at all in the use of ice. In those cases where we tried it in the hospital the results were uniformly unfortunate. I still believe, however, that we are justified in its use in sthenic cases in young persons, if it is agreeable to the patient, but if it makes the patient feel chilly and uncomfortable, it is apt, even in private practice, to do more harm than good. Tepid baths are undoubtedly beneficial and grateful to the patient, and the patient's feelings are, in many respects, the best criterion to go by. Opiates, in my opinion, quiet the patient's nervous system, and allow him to husband his strength until the disease has run its course. I know that in the hospital we have had better results since we began the routine use of antiseptics, especially creosotal. If they interfere with the patient's digestion, they should be discontinued. In a disease with a short duration like pneumonia, there is more danger of over-feeding than under-feeding. The patient should be given broths and peptonized milk, but the nutrition should not be over-crowded.

Heart failure has been the cause of death in a considerable proportion of our cases, especially in the hospital and among alcoholics. Digitalis has the effect of counteracting this condition and strengthening the heart, for

which reason it has gained reputation as an anti-pneumonic remedy. I agree with Dr. Wilson that just as good results can be obtained from the use of strophanthus, sparteine or caffeine as from digitalis.

Dr. JOHN HUNTER, of Toronto: The subject of the last paper is one in which I am intensely interested, and the only point I wish to refer to is our mode of treatment, or rather, of non-treatment, as carried out at the Toronto Western Hospital. On the beautifully shaded grounds surrounding that hospital we had erected, some years ago, a number of large tents, and into these we transferred many of our patients. When they were once placed in the tents it was difficult to get them back into the hospital. Since then we have adopted the open-air treatment in pneumonia and other diseases, and we have found it very beneficial.

Dr. WILSON: In regard to what Dr. Hunter said, I wish to add one remark which bears upon the importance of an abundance of fresh air in the treatment of acute diseases of the lungs. It is a well-known fact that cases of pneumonia treated in field hospitals do remarkably well as compared with those treated in the ordinary institutions. I have also made inquiries in this direction among men in lumber camps, and I have been told that while pneumonia is not at all uncommon there, it is not as fatal a disease as it is in our ordinary hospital service.

1. Lectures on Clinical Medicine, translated by Sir John Rose Cormack, American Edition 1873.
2. Norris: American Journal of the Medical Sciences, June, 1901.
3. Volkmann's Sammlung klinischer Vortraege, November, 1900. Translated in the Therapeutic Monthly, June, 1901.
4. Twentieth Century Practice, Vol. xvi.
5. Nothnagel's System, xiv Band.

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## LVI. PROLONGED MEDICATION, WITH SPECIAL REFERENCE TO DIGITALIS

BY ABRAHAM JACOBI, M. D., LL. D.
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SEVERAL meetings of the German Congress of Internal Medicine have discussed the effects of digitalis when given continuously for a long time. The question was also raised in a recent discussion, mainly by Dr. Robert Ingram and Dr. Frank Scherer, before the Academy of Medicine of Cincinnati.

The woful stories of its cumulative action were told and retold. Indeed, I dare say that there is no careful or careless practitioner that has not observed it: there may be nausea, vomiting, retarded or irregular pulse, and collapse. When I was young I saw it often, mainly after large and repeated doses, and remember well that I believed that I obtained a salutary effect—in pneumonia, for instance—from that very action. But after all time has taught me several things. I now know, for instance,

and have acted on that knowledge for more than a decade, that in many bad cases of dilatation of the right heart, with cyanosis and orthopnœa, when nothing but a large venesection appears to hold out a promise, one, two or three doses each of ten or twelve grains of digitalis, given at intervals of three or five hours, will contract the heart and restore pulmonary and general circulation; that, on the other hand, in chronic conditions of weak heart, of either muscular or nervous origin, or of insufficient action caused by pulmonary obstruction—as in chronic bronchopneumonia or in tuberculous infiltration—small doses of digitalis, that is, from 4 to 6 grains (0.3-0.4) daily, or its equivalent, may be given for weeks and months and even years without any hesitation. Such doses may be ordered while the patient is not expected to be seen for weeks or months. Indeed, there is hardly a day when I am not obliged to prescribe them to patients who I know will not reappear for a month or more. In most cases I prescribe either from four to six doses daily of Squibb's or any other good fluid extract, or the solid extract of the Pharmacopœia in the shape of pills, 1½ grain (0.1) daily, usually ½ grain three times a day, almost always in pills, rarely by itself, often in combination with sparteine, or strychnine, or arsenic or other drugs, as the case may require. Such combinations are generally observed to be useful, as nosologically they are required by the fact that the heart is not a uniform body but a combination of muscular, vascular, and cerebro-spinal and sympathetic nerve fibres; that we have but rarely to deal with an affection of only one of them, and that the theoretical demand of only one remedy in a prescription looks well on a platform, as the ornamental trimming of an impressive address to the young, but gives one but a poor show at the bedside.

Patients who take digitalis in this way do not show a cumulative effect, nor are they getting accustomed to it to such an extent as to lose the benefit of its action. Indeed, their heart requires a daily stimulation and daily doses. Mercury is given for months, iodides for months, not only in syphilis but in the cardiac ailments of atheromatous old age where digitalis is not tolerated, and in asthmatic conditions. Arsenic is administered in psoriasis, lymphomatosis and sarcomatosis for months and years with rarely an interruption unless the doses be excessive. Phosphorus demands a course of six or eight weeks to break up a bad case of rhachitis. Thyroid, thymus, or suprarenal gland is required for many months or even years to accomplish the end in view. Everybody knows that and should add digitalis to the list of his drugs that ask for continued small doses when a continued effect is expected.

This looks so simple and *is* so simple that I never knew these thirty or forty years that I did anything which required discussion. During all this time I practised this method, taught it and mentioned it in papers, for instance, in one on "Arsenic and Digitalis in the Treatment of Consumption," read before the New York State Medical Society in 1884. Great, therefore, was my astonishment when before the Seventeenth Congress for Internal Medicine, two years ago (1899), Dr. Grödel of Nauheim spoke in favor of continued small doses of digitalis in appropriate cases. He was frowned down by most of the celebrities present, but soon Kussmaul[1] published his cases of continued digitalis treatment, and he is not usually frowned down. Thus it happened that this year public opinion veered rather in the direction of Grödel's position on that question, mostly with the understanding, however, that a careful watch must be had over the patient. When the observations of the past two years will have been confirmed by those of the next ten, that careful watch will be discontinued as unnecessary.

In my paper read before you in 1884 I discussed the effect of small doses of digitalis continued a long time and their action in pulmonary phthisis. I then spoke as follows: "In the vertebrate, digitalis increased the energy of the heart muscle and the volume of its contraction. Thereby it increases arterial pressure and diminishes the frequency of the pulse. In this connection it is of no consequence whether the irritation of the inhibitory nerve is the primary or the secondary element. By increasing pressure in the arteries, besides favoring the secretion of the kidneys, it improves the pulmonary circulation, empties the veins and thereby accelerates the circulation of the lymph and tissue fluids. Thus, while having an immediate effect upon the heart and lungs, it exerts a powerful influence on assimilation and elimination, that is, nutrition in general.

"Therefore, both the local and general effect of digitalis are invaluable in all stages of phthisis. While, however, they may relieve in the last, they are a healing element in the first stages; the congestive and nutritive changes constituting the preparatory and, in part, the advanced stages of consumption are favorably influenced. I seldom treat a case of pulmonary tuberculosis without it. Very little care is required to avoid disagreeable results. Cumulative effects are either the consequence of excessive or too frequent—unnecessarily frequent—doses, or of the selection of improper preparations. Such, however, as are soluble in water with difficulty ought not to be used, for it may happen that, having been inert for some time, a large amount may enter the circulation at once. Particularly is this true of

digitalin, which is by no means a soluble alkaloid, but a crystallizable glucoside of uncertain strength. The digitalins of different manufacturers yield widely differing results; the majority require immense doses compared with the dictates of the books in order to exhibit a perceptible effect. I use the infusion, the tincture, the fluid extract, and the solid extract. Their relative values I do not desire to discuss, except in regard to their advisability in phthisis, and the possibility of continuing them for a long time. Patients of that class we see from time to time only; they require advice and prescription for protracted periods. As a rule their digestive organs are amongst the first to suffer; indeed, many an alleged dyspeptic patient is afflicted with gastric disturbances first, and has his attention drawn to the lungs by his physician, who discovers the cause of his gastric catarrh in the retarded circulation of heart and lungs.

"In such a case the stomach exhibits the peripherous symptoms of the distant diseased organs in the same manner that a local disease of the brain or cord shows itself first in affections of peripherous nerves. Now, whenever the stomach is first affected neither the tincture nor the infusion is tolerated long. The latter, the officinal preparation, may be given three times daily in doses of half a tablespoonful each, or in two of three teaspoonfuls each, for some time; but I seldom wish to recommend it for more than four or five days in succession without seeing the patient. The fluid extract has often disappointed me; I cannot tell why, nor do I claim to know why. [That is what I said sixteen years ago; I can now say after daily observation extending over many years, I have learned to rely on Squibb's and some other fluid extracts.] My main reliance is on the solid extract and my almost universal method of giving it is in the form of a pill, in such combinations as will suit the individual case. The stomach does not object to it and taste is not offended by it. I often prescribe 1½ to 1¾ grains, corresponding to three and a half times its weight of digitalis, for weeks without expecting to see the case again. It combines with extract of nux vomica, with iron, with arsenic, with extract of belladonna, or extract of physostigma (Calabar bean), with ext. coloc. compound—in fact, with anything. Such combinations are frequently required in the early stages of consumption. The general muscular system needs toning up, the intestinal muscle requires strengthening, the intestinal tract evacuation, the intestinal and abdominal circulation easing. At the same time, iron may be added when there is no fever; or caffeine for its stimulant effect upon the heart and arteries."

Speaking as a general practitioner before a meeting composed

almost exclusively of general practitioners, I desire to add in this connection a single remark on the general usefulness of digitalis in other cases. Every chronic disease and the results of the wear and tear of what is called civilized life have a depressing influence on all parts of the organism. The heart is not the last to suffer. Its muscular strength is tasked every second; it is the very organ that cannot and must not rest. Stagnation in an outlying province will overexert it; ill nutrition of the nerves will influence it, general anemia exhaust it, infection paralyze it, weak circulation or venous obstruction interfere with its structure and strength.

Now, what alcohol and ether are to the nerves, strychnine to the muscles in general, digitalis is to the heart, except in a condition of acute myocarditis. The increase of arterial pressure which it produces is beneficial not only to the outlying provinces, but also to the circulation and nutrition of the heart muscle itself. Thus, in all cases of general anemia, in slow convalescence where iron and nux vomica are called for, digitalis is likewise required. It strengthens the heart, propels the blood stagnating in its own fibres, and shortens the period of recovery. I have learned to look upon digitalis for restoring vigor and strength as of more than mere symptomatic value; I consider it one of the best tonics, along with iron, nux and arsenic, when given in small doses persistently.

The main effect of digitalis is the increase of cardiac contraction and of the volume of the pulse. Both are, according to Schmiedeberg, caused by the improved elasticity of the heart muscle and its more intense shortening during systole. The concomitant result is an improved action in diastole, for a heart that is thoroughly emptied during systole is better qualified to aspirate a new supply. The retardation of the heart-beat resulting from the stimulation of the pneumogastric nerve through the action of digitalis allows opportunity for the complete emptying of the ventricle with consecutive improved aspiration; in other words, the arterial blood-pressure and circulation are increased and afford the veins ample opportunity to discharge their contents. That is the effect of large doses of digitalis given once or oftener. To give big doses too often may lead to the exhibition of one or more of its bad effects, the so-called cumulation. Large doses, however, are not required for long, but many cardiac diseases demand moderate doses for moderate effect; more still require a persistent effect for the symptoms caused by anatomical lesions which cannot be removed. It is these that cause a persistent moderate incompetency of the action of the heart, which can be dealt with only by just as persistent moderate doses of the

proper remedy. Years of cardiac ailment should be met by years of cardiac medication. This is intelligible to those who will be good enough to consider that insufficient metabolism and the hunger of the tissues can be treated only by persistent feeding, say three or four times daily, and not by the pouring in of a dozen beefsteaks at a time with fasting afterward.

The small doses which I recommend as the regular daily measure have only a moderate action on the blood-vessels. That is important to know, because large doses may contract the small arteries to such an extent as to increase the labor the heart has to undergo to overcome the increased peripheral resistance.

The indications for the use of digitalis according to the methods just indicated are the insufficiency of the heart muscle and the incompetency of the mitral valve. Chronic myocarditis is no contra-indication. Large doses may overexert the inflamed muscle; that is why digitalis in large doses is very badly borne in *acute* myocarditis; small ones are often serviceable when the first onset is passed. Aortic insufficiency has been declared a contra-indication to digitalis by some, an indication by others. I feel certain that these observers had different cases to deal with. Aortic insufficiency, when incipient or moderate, is easily compensated, gives no uneasiness to the patient, is not complained of, and is seldom observed when recent. This is the time when such doses of digitalis continued a long time prove of permanent service. Only those, however, can be thus benefited whose cases are recognized early, either accidentally or through careful self-observation by the patient. When, however, the case is old and compensation greatly disturbed, with considerable peripheral venous obstruction, even digitalis will not suffice to restore the equilibrium between the action of the heart and the capillary circulation of distant organs.

A last word on one form of incompetent metabolism with which we frequently have dealings, namely, chlorosis. I never treat it without adding digitalis to the iron and the mild vegetable purgative the patient is to take. Its influence on the circulation of the body in general and the heart vessels in particular is such as to improve general and local nutrition for reasons detailed before. All forms of chlorosis are benefited by it, the common as well as the severe form pictured by Virchow and Germain Sée. In this, while the heart may be normal in size but is generally of feeble structure, the arteries are small and do not provide for a sufficient organic nutrition. It will be easily perceived how the action of digitalis in small doses, persistently given, cannot help but be beneficial.

# LVII. ON THE IDENTIFICATION OF THE CARDIAC NEUROSES, WITH SPECIAL REMARKS ON THE NOMENCLATURE

By JAMES K. CROOK, M. D.
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The researches of physiology have taught us much regarding the mechanism of the heart and its adjuncts in the circulation of the blood. We have thus learned the seat of the automatic and rhythmic action of the cardiac muscle and are able to descry the part played by the nervous system in controlling the force, frequency, and rhythm of the heart's pulsations, and the tonicity or laxity of the arterial walls. But this knowledge has not so far greatly aided us in a definite appreciation of the pathogenesis of the various disordered states which we designate the cardiac neuroses, nor has it to any appreciable extent quickened our perception as to a proper interpretation of the clinical manifestations of these disturbances. The physiological relations existing between the vagus and sympathetic supplying cords, on the one hand, and the cardiac ganglia and musculature on the other, have not been sufficiently defined to enable us to agree upon any fixed or definite anatomical, pathological, or even clinical basis in our attempts to explain the cardiac neuroses. We have thus at least a partial justification for the unsatisfactory state of the contemporaneous literature on this subject.

*Nomenclature of the Cardiac Neuroses.*—Until a very recent period the term palpitation was made to cover practically all of the nervous disturbances of the heart. With increased experience and additions to our clinical knowledge this restrictive appellation no longer serves its former purpose. It would appear, indeed, that we are in danger of going too far in the opposite direction. During the last decade or two there has developed an embarrassing tendency to multiply terms in labeling the functional derangements of the heart. Furthermore, no two writers appear to agree exactly in classifying these disorders. It thus transpires that the nomenclature of the subject is at the present time most bewildering to the seeker after information. As above premised, our physiological knowledge does not yet afford us a solid groundwork upon which to erect a permanent clinical classification. Again, some of the conditions which we find it convenient to describe under distinctive titles so shade into each other that it is difficult to describe where

one begins or another ends. For example, the condition described as palpitation may present at times the symptoms of the irritable heart or of arrhythmia, while in tachycardia the features of palpitation, or even of pseudo-angina, may obtrude themselves. Some of the terms employed do not constitute true symptom groups; they are mere symptoms themselves and not distinct diseases. It has seemed to the writer, however, that all we know at the present time concerning the clinical and pathological features of the cardiac neuroses may be properly set forth under the following heads: (1) palpitation; (2) tachycardia; (3) bradycardia; (4) the dyspeptic heart; (5) neurasthenia cordis; (6) the irritable heart; (7) arrhythmia, including tremor cordis and delirium cordis; (8) the heart in Graves's disease; (9) angina pectoris, including pseudo-angina. A careful study of all the available facts connected with these different disturbances, coupled with the writer's own clinical observations, leads him to the belief that the following-named may be regarded as distinct diseased conditions, viz., palpitation, tachycardia, neurasthenia cordis, arrhythmia, and angina pectoris. The remaining terms do not express morbid entities, but rather symptoms or sets of symptoms which are found in other diseased states.

*Palpitation.*—According to Balfour, all who suffer or think they suffer from disease of the heart are prone to palpitation. Under Laennec's definition, any person whose heart's action obtruded itself upon the consciousness might be said to be a victim of this disorder. In accordance with recent onomatology, however, the name is used to cover a much more limited class of cases. One by one symptoms formerly referred to as falling under this term have been relegated to other forms of disturbance until, at the present time, palpitation has become quite unfashionable. The writer believes, however, that the name may still be employed to cover a substantial and distinct disorder. It is frequently a symptom or concomitant of other more striking disturbances or diseases, but in numerous instances it constitutes the sole, or at any rate, the most important, clinical factor. More or less palpitation, indeed, falls within the experience of probably every living human being of adult life. What are the marks of simple nervous palpitation and how may it be identified? Let us take an illustrative case. A young lady calls at the office with the information that something is wrong with her heart. She states that it appears to throb or jump disagreeably and at times feels as though it would stand still. A deep respiration may cause a shooting or darting pain to penetrate the region of the apex. Beyond this she has nothing to complain of. Her appetite is good and all of her functions appear to be properly performed.

Possibly it will be learned on inquiry that she drinks two or three cups of rather strong tea daily. If the patient is a lad, possibly he has learned to smoke cigarettes. We can usually learn the cause of the cardiac aberration, but this does not supply us with a name for it. The heart is carefully examined and found to be quite normal. There is neither intermittent nor other form of irregularity, although the rate may be somewhat quickened. Such a case is one of simple cardiac palpitation, properly so called. Even though there be slight signs of flatulent dyspepsia or a mild grade of anæmia, the cardiac symptom being most prominent and the only one complained of, we are still warranted in labelling the case one of palpitation.

*Tachycardia.*—Etymologically (ταχύς—quick, καρδία—heart), this word means a quick heart, but the name does not afford altogether an accurate conception of the disease. Tachycardia is characterized by an increased frequency of the cardiac pulsations, but not every person with a quick heart can be classed as a victim of the diseased condition which we now recognize under this appellation. Many persons have normally a heart's action of 100 or more, but these cases do not meet the requirements of tachycardia proper. Nor does the rapidly acting heart of emotional disturbance or that associated with tuberculosis, fevers, organic heart disease, or Graves's disease. Although the term has been greatly abused, tachycardia embraces a fairly constant symptom group and, as such, is entitled to be regarded as a separate morbid entity. Like palpitation, however, it may occur as a complication or as a symptom of other conditions more serious or more pronounced. Many theories have been offered in explanation of this strange affection, but none of them are fully satisfactory. In the present state of our knowledge we can do little more than guess whether the immediate causes lie in the augmentators of the heart, the vagus, the intracardiac nerve ganglia, or the muscular structure, or whether it is of centric origin. Possibly it is due at times to some eccentric irritation, such as a diseased ovary, a floating kidney, or a neuritis of distant cords. It seems rational to attribute the trouble in most cases to overstimulation of the accelerators or to paralysis of the inhibitory nerves; probably in extreme cases both factors are operative. Whatever the underlying cause may be, the result is a serious unhinging of the cardiac mechanism, producing an essential neurosis. How may it be identified? In essential paroxysmal tachycardia the attacks may occur in a person who otherwise enjoys a fair degree of health. It is apt to be ushered in about as follows: A peculiar sensation of lassitude or restlessness steals over the patient; slight vertigo occurs; the extremi-

ties become cold or numb, and a shivery feeling creeps up and down the spine. The face may become ashen or mottled. A sensation of oppression or tightness, but not of palpitation, is felt about the heart. This may occasionally amount to actual pain. An examination of the heart will now show a pulse rate of 120, 140, or 160. Sometimes it is so frequent as to be counted only by the use of the sphygmograph. Dr. Bristowe met with a case in which the pulsations were 308 per minute. The use of the stethoscope shows no murmur or other evidence of organic disease of the heart. The pulsations have a tick-tack sound, and not all of them are propagated as far as the wrist. In most cases the urine is scanty, but nervous polyuria may exist. The attacks usually last for a few moments only, although cases of prolongation for several hours, or even several days, have been seen. The attack generally ends suddenly with a few parting twinges of pain and twitching. The presence of these features thus outlined, in whole or in part, will usually suffice to satisfy the observant practitioner as to the nature of the case with which he is dealing. It should be further remembered that the disease occurs with about equal frequency in the two sexes, but that very few cases are met with prior to the twentieth year of age.

*Bradycardia* (from βραδύς, slow, and καρδία heart), otherwise known as aræocardia, oligocardia, pulsus rarus, pulsus tardus, etc. In bradycardia the cardiac pulsations fall far below the normal standard in frequency; pulse-rates of 50, 40, 30, and even 20, have been observed. This condition cannot, in our present state of knowledge, be identified as a distinct affection. The name connotes nothing and signifies nothing more than a phenomenon common to many definite groups. There is not, as in tachycardia, a particular symptom group of which a slowly acting heart is itself the center. Cases of what was supposed to be essential paroxysmal bradycardia have been reported, but further observations have shown that the slow heart in these instances was always secondary. A description of the condition, therefore, can consist only in detailing the various disorders or diseases of which it is one of the clinical features. We may, if we choose, denominate any case of slow heart one of bradycardia, but the designation is superfine and superfluous.

*The Dyspeptic Heart.*—Is there a symptom group, referable to the heart as its center, occurring with sufficient frequency or uniformity to warrant the addition of this term to our nomenclature as a separate and distinct affection? After much careful thought and observation the writer is led to answer this question in the negative. Aberrations of the digestive functions lead to all kinds of disturbances of the heart's action, whether they

take the form of palpitation or of tachycardia, of neurasthenia cordis, or of pseudo-angina. These neurotic manifestations due to indigestion present nothing peculiar or distinctive, however, but are quite similar to those resulting from other causes, plus the presence of features referable to the stomach or intestines. We may speak of a dyspeptic heart as a symptom, but there is no such disease as the dyspeptic heart.

*Neurasthenia Cordis.*—This condition is very similar in some of its manifestations to the irritable heart of some authors. It is practically identical with the not infrequent class of cases somewhat loosely referred to as the "weak heart." The condition denotes aberration or insufficiency of the heart, the result of defects of innervation. It is clearly a neurosis and in our present state of knowledge excludes all organic disease. The marks of identification are as follows: The patients are usually of the neuropathic type, probably the result of defective endowment, hereditary or otherwise. It is brought on by long-continued depressing emotions, frequent excitement, long marches, over-study, failure in business, onanism, sexual excess, or coitus reservatus, and follows convalescence from prostrating diseases, especially the essential fevers. Being to some extent an occupation neurosis, it is more frequent in males than in females. Clinically the cardiac features predominate, although general nervous manifestations are usually prominent. The patient is fretful, irritable, and fidgety. He is easily startled on sudden excitement, and is apt to be more or less hypochondriacal. The cardiac attack usually begins with a feeling of discomfort or uneasiness about the heart. There is some quickening of the apex beat, and more or less irregularity or intermittence is observed. The first cardiac sound is short and lacking in volume; the second sound is not accentuated. The patient is apt to show vaso-motor disturbances in the shape of pigment changes of color in the face and sudden coldness followed by burning heat of the hands and feet. The sleep is restless and the patient is apt to awake with a sudden jump of the heart. After the stage of irritability the patient falls into a state of depression marked by defective nutrition. The patient's long-continued general neurasthenic state, coupled with the cardiac symptoms and with the absence of any evidences of organic trouble, Addison's disease, carcinoma, or tuberculosis, renders the existence of neurasthenia cordis altogether positive, or at least strongly inferential.

*The Irritable Heart.*—Under this name a form of cardiac neurosis is described in various ways by different writers. The term was originally used by Da Costa in describing a peculiar cardiac excitability which he found to exist among soldiers in the field.

In the form of the trouble described by Allbutt, which tallies closely with the affection as it has come under the writer's observation, the patient complains that he is never free from a tired feeling about the heart. Sometimes a sharp pain is felt; the organ is liable to throb and jump and is never entirely outside of the consciousness. Even when the patient is lying quietly in bed it makes itself a nuisance, banging away when the sufferer should be asleep, while exercise or exertion brings on a violent beating. This trouble frequently remains among college men as a memento of the wear and tear, the indiscretions, and untamed passions of youth. Spasmodic bouts of study, overdoses of alcohol and tobacco, late suppers, overwork in the gymnasium, and other incidents of an irrational and irregular life in a nervous and dyspeptic young person go to form the groundwork of the irritable heart. A physical examination may show a slight degree of hypertrophy, but dilatation is most frequently present. The peripheral arteries are lax, the pulse is dicrotic, and the slackness is in marked contrast with the excitable state of the heart itself. The rhythm of the cardiac contractions is often a little uneven, and the second sound at the apex too loud. The action of the heart may seem labored and heavy under the palpating hand. The irritable heart is described by some writers under the head of palpitation, arrhythmia, or neurasthenia.

*Arrhythmia* (α priv., and ῥυθμός, rhythm), known also as the pulsus inæqualis, or pulsus irregularis, is a disturbance of the rhythmic contractions or regularity of the heart. The cardiac pulsations may be normally intermittent or irregular in some persons, and slight deviations of this kind are not incompatible with the complete and proper performance of the cardiac function. It is not uncommon to notice a certain disturbance of the rhythm in childhood, especially during sleep, which disappears after the child awakes and runs about. This has no pathological significance, but the irregularities which are increased by exercise or excitement, especially if accompanied by pain or palpitation, are always a sign of gravity. The condition of arrhythmia at times complicates all the other cardiac neuroses, as well as organic diseases, but it is frequently present without other symptoms or signs, and constitutes the sole evidence of cardiac trouble. It is, of course, an objective phenomenon and can be recognized only by actual observation of the heart's action as well as of the pulse.

*Tremor Cordis.*—This is not a morbid entity, but it is a symptom sometimes met with in neurotic persons, especially those who suffer from indigestion. It is a peculiar form of irregularity which seizes the sufferer without a moment's warning. The

symptom is exceedingly alarming to the sufferer, but is devoid of danger. It may be recognized by the following features: "Like a bolt from the blue, and with as little warning, a quiet, steady heart is suddenly seized with a rapid fluttering, and the ordinary full pulse of health suddenly drops to a mere tremulous thread" (Balfour). The attacks may vary in duration from the space of three or four to a series of short, rapid, incomplete systoles, extending over several seconds. On laying the hand over the heart a delicate tremulous sensation is felt, and the radial pulse is scarcely perceptible. The paroxysm ends suddenly with an unusually forcible beat. It is seldom attended by faintness or vertigo.

*Delirium cordis* denotes an extreme degree of irregularity, accompanied by intermittence and a rolling or staggering sensation conveyed to the palpating hand. It is usually classified as a neurosis, although, as it seems to the writer, improperly so, as true examples of the condition are found only in cases of dilatation and occasionally in mitral stenosis. It is at once recognized by its prominent characteristics. Auscultation shows the heart to be irregular; even in its irregularity there is no "method in its madness." It will intermit, beat slowly for one or two or half a dozen beats, then pulsate so rapidly as to be uncountable for a few moments; but this rotation is not maintained. Counted for a full minute, we may find the rate 110, the next minute 170, the third 130, and the fourth so rapid, intermittent, and irregular as to be indeterminable. The average number of pulsations is always far above normal if counted at the apex; whereas, at the wrist, perhaps not more than half the beats can be appreciated.

*The Heart in Graves's Disease.*—Graves's, or Basedow's, disease, more recently known as the thyreoid cachexia, is classified by many authors as a cardiac neurosis. This, it seems to the writer, is not fully warranted. The clinical triad which constitutes the basis of a typical case of this affection is as follows: First, a rapidly acting heart; secondly, enlargement and undue prominence of the thyreoid gland; thirdly, protuberance of the eyeballs. Not all of these manifestations are invariably present, the bulging eyes and hypertrophied thyreoid, one or both together, being most frequently absent. The rapid heart is the most constant symptom, but the writer has seen more than one case presenting all the other usual signs and symptoms of Graves's disease, with a heart's action but little, or not at all, accelerated. But, in a well-marked case, the action of the heart is very rapid, amounting to 120 or more pulsations per minute. This is often attended by a violent throbbing which extends

even to the smaller arteries. The sounds of the heart are also greatly augmented in volume, being audible in some instances at a distance of several inches from the chest. This peculiar action of the heart differs from simple palpitation by its continuity, and by the fact that the throbbing embraces the small arteries as well as the heart and great vessels. By these features, supplemented as a rule by the general symptoms of anæmia, Graves's disease is usually easy of recognition.

*Angina Pectoris.*—This name (*angere*, to bind, to strangle) was introduced by Heberden in 1768. The affection has also been known as stenocardia, sternalgia, and breast-pang. There are two varieties, the true, or angina pectoris proper, and false, or pseudo-angina. True angina is always attended by structural changes, and is no more a neurosis than is atheroma or endocarditis. It is usually treated in the books as a neurosis, however, and this is at least partially justified by the fact that the most formidable and striking evidence of the trouble undoubtedly has its origin in some of the nerve structures communicating with, or located within, the heart. Many authorities have regarded it as a neuralgia. Pseudo-angina is not attended by organic change and is indisputably a neurosis. The features of false angina are not usually so severe as those of angina vera, but it is not always possible to separate the two. A fatal issue has undoubtedly resulted from pseudo-angina pectoris in some instances.

Symptoms and Diagnosis.—The structural changes which constitute the basis of true angina pectoris do not occur in early life; thus, the affection seldom makes its appearance before the fortieth year of age. It is much more frequently encountered in males than in females. The initial paroxysm may set in suddenly and without previous warning, although the marks of arteriosclerosis and general failure of health and strength may have shown themselves for some years. Cardiac palpitation and arrhythmia are usually experienced beforehand. Probably no condition in the entire range of our knowledge entails more dreadful agony than that of a typical attack of true angina pectoris. The seizure may appear when the patient is sitting quietly or resting in bed, but is most likely to come on during some exertion, such as going up stairs, climbing a hill, "breasting the wind," or straining at stool, or while he is laboring under some form of excitement. The paroxysm is of overwhelming suddenness and of unspeakable intensity. The pain begins in the præcordial region, usually about the mid-sternum, and radiates, as a rule, upward into the left shoulder and down the left arm as far as the fingers' ends. Sometimes it is propagated in

the direction of the right shoulder or possibly downward toward the hip or lumbar region. The nervous system is acutely alert. One of the most characteristic features is the sense of imminent death. The patient feels as though the heart were being tightly squeezed in the grasp of a gigantic hand. The features are haggard and the face is blanched, the forehead is bedewed with a cold sweat. In many cases, a sense of coldness, numbness, deadness, creeping, or other vasomotor disturbance is felt. Occasionally the pain may not be so acute, but takes the form of a dull ache (*angina sine dolore*) and is overshadowed by the intense anxiety. The respiration, as a rule, is in nowise affected, but may be hurried and superficial. The patient is well able to take a deep breath, but is afraid to attempt it. He usually prefers to keep perfectly quiet in a sitting or upright posture for fear of increasing the severity of the paroxysm. A physical examination may or may not show the signs of the organic heart disease; the most frequent lesion is aortic stenosis. During the attack the heart's action may be increased or diminished in frequency. In one of the writer's patients it sank as low as 40 per minute. The blood pressure is always raised in the beginning of an attack, as shown by the tenseness and incompressibility of the arteries. The seizures may last from a few moments to an hour or more, probably five or ten minutes being about the average duration. After the attack, which may cease as suddenly as it set in, the patient feels weak and exhausted for a short time. A sensation of formication or numbness may be experienced, and there may be a considerable belching of gas and voiding of large quantities of urine.

The recognition of true angina should not be difficult. No other condition presents the same complex of symptoms—sudden irradiating pain, squeezing, tightening, constriction, overwhelming fear of immediate death, etc. From pseudo-angina it is distinguished by its occurrence almost invariably in males past the meridian of life and by its greater severity. Huchard's aphorisms, while not infallible, are important: (1) Every angina produced by effort is true angina. (2) Every angina which occurs spontaneously without effort is a false angina. (3) But an angina occurring at night, though independent of effort, is a true angina. The absence of all signs or symptoms of organic disease of the heart creates a presumption in favor of pseudo-angina.

# LVIII. PATHOLOGY AND TREATMENT OF MIGRAINE

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It is particularly in functional nervous diseases that the subject of etiology is of such practical importance. In the case of migraine it is not too much to say that the line of treatment will be determined mainly by the answer given to the question, whether the affection be due to a nervous disease or to a toxæmia. We will, therefore, discuss this question first, for there is little need to refer to its symptoms or accompaniments when these have been better detailed than might be expected for any other malady, owing to the fact that so many eminent medical men have had full occasion to observe them in their own persons, and have described them accordingly.

In favor of migraine being due to a specific derangement of some part of the nervous system, the predominance of purely nervous symptoms is cited. The severity of the pain: the peculiar derangements of vision; the common limitation of the headache to one side, as if its chief seat were in one cerebral hemisphere; the mental sluggishness which accompanies it: and the frequent radiation from the head to the extremities of various sensory disorders, analogous to like symptoms in affections of the central nervous system, have led many authors to regard it as the manifestation of a faulty nervous organization. The undoubted fact that migraine is more distinctly hereditary than any other nervous disease, or, in fact, than almost any disease, is held to be strongly corroborative of the supposition that it is caused by an original constitutional defect in nerve nutrition. The primary seat of this defect is variously surmised, though, owing to the numerous signs of vasomotor derangements during the attack, many writers hold that it is the sympathetic nervous system which is chiefly involved.

The treatment for migraine, which such theories of its nature and pathology suggest, is sufficiently illustrated in the following recommendations to be found in one of the latest publications on the subject. (Article on Migraine in "Allbutt's System of Medicine," by Dr. James McKenzie.)

"It is difficult for most sedentary persons to accumulate that measure of bodily vigor which is necessary to combat the returning attacks of migraine. In the next place, dietetic and medicinal rules should be adopted which may favor the development of

more robust health. Careful regulation of the diet, so as to avoid the errors of feeding which are so common among the classes above specified, and the adoption of a dietary containing nutritious and easily assimilated food will do much to lessen the frequency of the attacks. Medicines, such as quinine, iron, nux vomica, nitrate of silver, will be found beneficial mainly for their tonic properties. Any tendency to constipation should be corrected. For those patients in whom the attacks recur with great frequency, and for those in whom the 'status hemicranialis' is established, it is often necessary to employ remedies to give the patient some immediate relief. For this purpose, nerve sedatives, judiciously administered, are beneficial, and of these I have found the bromides, particularly the bromide of ammonia, most beneficial. In extreme cases, the drug should be pushed until slight persistent drowsiness is produced. The patient not only sleeps better, but the attacks often disappear under its use. Then, after a week or two, the employment of tonic medicines and hygienic regulations lead usually to satisfactory results. When the more severe attacks are impending, no remedies appear to be of any avail, whether in stopping the attack or lessening its severity. Frequently, however, the milder attacks may be cut short by this remedy or that, and the most efficacious of these is found in the class of drugs represented by phenacetin and antipyrin. Among other remedies which have also been found beneficial in modifying an attack of migraine are caffein, guarana, cannabis indica, and salicylate of sodium. When the pain is so severe as to be almost unbearable, relief can only be obtained by the judicious use of such exceptional and occasional means as inhalation of chloroform vapor or the subcutaneous administration of morphine."

What such a scheme of treatment amounts to, is some good advice that the patient should observe the laws of health, take "tonics," if needed, and, when he has sick headache, try an empirical list of sedatives. It shows no guiding principle based upon the cause and nature of the malady, and it would prove totally inadequate for really severe cases; yet, it is only severe cases which should be chosen to furnish the test of the efficacy of any form of treatment, for the great majority of the sufferers from migraine have their attacks but now and then, and but for one day. The recovery is complete and apparently spontaneous, and but for these occasional relapses they, as a class, lead active and enjoyable lives.

Very different is the experience of others whose lives become burdensome with repeated recurrences of the worst kinds of suffering, accompanied with a variety of distressing symptoms and

with deathly prostration, from which they scarcely recover and begin to resume their daily occupations before the dread visitation is on them again. Not infrequently the general health becomes deteriorated, and they become both emaciated and anæmic. Such patients are the despair of their medical advisers, for all varieties of drugs and of prescriptions are tried and abandoned in turn, just so long as the conception of the disease being a neurosis continues to be held by the physician.

We would, therefore, approach the subject of the pathology of migraine from quite a different standpoint.

In the first place, it cannot be ranked among the class of nervous diseases to which the term degenerative can be applied, like a trigeminal neuralgia which comes on late in life; for migraine is not only a disease of youth and of the prime of life, but it actually declines and generally ceases after fifty. Nor can its victims be called degenerates compared with their fellows. Gowers enumerates among its sufferers, and who made it a study, the celebrated Dr. Fothergill, Marmontel, Haller, Wallaston, Du Bois Raymond, Wheatstone, Sir John Herschell, Sir George Airy and his son, Sir Herbert Airy, who gave a very interesting account of his ocular symptoms in the "Transactions of the Royal Society."

On the other hand, there are whole classes of people who never have migraine. They may furnish their proportionate quota to other nervous derangements, but not to migraine. Why not, is a question which must be studied, because migraine itself is a class disease; that is, just as one class of persons do not have migraine, so we find that others suffer from migraine in a common proportion. They may differ in everything else, but in liability to migraine they are all alike. There must be some explanation for this contrast, and that explanation we shall find to come very close to the root of the matter.

Those who do not have migraine are sailors, agriculturists, miners, truckmen, carpenters, and all outdoor laborers without exception. Those who do have migraine are clergymen, students, professional men, brain and not muscle workers, housewives, shop girls, needlewomen, and indoor people generally, and, therefore, more commonly women.

There is certainly no accounting for two such opposing lists by class differences in cerebral organization or in their sympathetic ganglia. But there is a great class difference which is as unmistakable as it is significant, viz., in the physical habits of life; or, to be more precise, in those physical habits which most affect the portal circulation.

This portal circulation is necessarily the weakest in its share

of the propulsive power of the heart of any department of circulation of the body, and the most dependent, therefore, on adjuvants external to itself. It constitutes a current great in volume, at all times equal to about one-fourth of the mass of the blood, but intercalated, not upon the direct arterial, but upon the returning venous current, and delayed further by having to course through a second capillary system in the virtually non-contractile tissue of the liver. Moreover, its vessels, including its accompanying lymphatics, are the most tortuous in the body. By far its most important adjuvant is the powerful mechanism of the muscles of respiration, especially the diaphragm and the abdominal muscles. No better illustration of this fact is found than in the secretion of bile, a fluid of markedly low specific gravity, about equal in its daily amount to that of the urine, but secreted at so low a pressure that it might almost be compared to a simple leakage, as we find that the most moderate obstruction in its channels, such as catarrhal swelling of the mucous membrane of the bile ducts, suffices to cause jaundice.

Now, it has been experimentally demonstrated that the active movements of the over-arching diaphragm alternating with the active contraction of the abdominal walls, especially in deep breathing, greatly increase the flow of the biliary secretion—a fact also illustrated by the serious results of phrenic paralysis in disease on the whole abdominal circulation. Now, add to this that both the pulse force and the frequency of the general circulation fall at once in a sedentary compared with a standing posture, let alone the greater change still from general exercise, and there cannot but be the most material difference between the portal circulation of the farm laborer, strongly compressing and relaxing all his abdominal muscles in deep breathing while at work, and the relative total inaction of the same muscular apparatus in the brain worker at his desk, or the needlewoman at her sewing. Biliary stasis accounts for the statistics of our post-mortem tables, that after fifty one woman out of every four has gallstones. But stasis in the liver involves stasis also in the entire gastro-intestinal tract, and that, in turn, implies both imperfect digestion and chronic constipation.

If, however, imperfect digestion were all that chronic portal stasis implies, it would have but little bearing upon our present subject. Rather, we may say that modern research is increasingly demonstrating the poisonous properties of the products of imperfect digestion, and, what is more, has experimentally proven that some of these products are exclusively nerve poisons. There are many observations which also go to show that one of the great functions of the liver itself is to neutralize gastro-

intestinal nerve poisons, so that, when its functions are experimentally interfered with, prompt poisoning with distinctively nervous symptoms follows. In short, there is not a headache, nor a neuralgia, nor a vasomotor derangement, familiar to us, among the symptoms of migraine which cannot be produced by poisons manufactured in our laboratories out of the elements of our daily food by subjecting those foods to conditions similar to those present in abnormal digestion in the alimentary canal.

What the actual poison is which may be the agent that produces migraine, we are not yet able to demonstrate. Analogy with the facts of drug poisoning indicates that it may be but minute in amount. I have seen in susceptible persons, especially in women subject to migraine, a small dose of morphine produce intense headache, total suspension of digestion, nausea, vomiting, and extreme prostration, besides marked vasomotor disturbances. Hence the whole contention, that the varied nervous symptoms of migraine point to it as being a nervous malady, falls to the ground when confronted with the familiar facts of toxæmia induced by our long known nerve poisons. There is also no one fact better established about ordinary drug poisons than their peculiarly selective action. Not one of them acts on all nervous functions, but rather picks out one or more of them so definitely that we recognize their presence in the blood by the special symptoms which they cause. In other words, each of them, while acting, produces a special nervous malady, with its own characteristic sequence of disturbance of nerve functions, precisely as we note a characteristic sequence and grouping of symptoms in migraine itself.

The fact that migraine is notably a hereditary, or, in other words, a family, complaint is accounted for easily on the toxæmia hypothesis by the parallel fact that there is nothing so hereditary as peculiarities of digestion and of indigestion. Even some acquired derangements of metabolism, such as gout, which practically is a disease prevailing only where fermented liquors, in distinction from spirits, are used, become in time as hereditary as migraine.

On the other hand, it is in the case of blood poisons alone that we have any analogy to the striking intermittency of migraine. A true nervous disease may remit, but it never intermits. Its presence can always be detected if carefully looked for. But the most experienced neurologist would be unable to foretell that the vivacious guest next him at dinner will in two days be utterly prostrated with a return of an old migraine. And in the case of more than one well-known blood poison much the same thing happens. The poison of gout may be circulating in the veins

for days, and yet not until some midnight hour explode in an attack of gouty asthma. A sudden attack of uræmic convulsions always implies a uræmia long antecedent to that unexpected nervous derangement, and a like explanation of the cumulative process of a blood poison in migraine is far more probable than Liveing's fancied theory of a nerve storm.

Views of pathology, however, are only of academic interest so long as they do not supply data for practical applications. I hold that therapeutics is a test of pathology. If a theory does not bear fruit in suggesting lines of successful treatment, by so much is it discredited. It is because I feel that I have been justified by results in the management of severe, and not of ordinary, cases that I would close with a brief outline of what I may term the antitoxic treatment of migraine.

In the first place, all disorders that are due to contravention of physiological laws must be treated by a return to obedience to those laws. Migraine is one of the penalties exacted for neglect of the means provided by nature to assist the portal circulation, and to keep it free and active. If the persons so affected will continue to lead such sedentary lives that practically half of nature's apparatus for that end is left unused, they must pay the penalty in feeble and imperfect digestion with consequent clouding and suffering of the nervous system from chronic poisoning. But how to meet this indication for securing habitual activity of the portal system is often practically one of the most difficult undertakings for many patients under the conditions of modern civilization; and it must be left to each physician to devise his measures for each individual case.

We are, therefore, most commonly obliged to have resort to medicinal means and regimen for prevention of the attacks in the first instance, and then for the alleviation of them when they do occur.

First, therefore, as to prophylaxis. All severe cases, without exception, are chronic dyspeptics, and of this one of the commonest symptoms is chronic constipation. A mercurial laxative, such as a five-grain blue pill at night, with a saline in the morning to secure its action, is a weekly prescription of mine which I strongly insist upon in every case, to be kept up for months together. I am sure that we do not possess a more certain intestinal antiseptic than a mercurial cathartic, and I never feel satisfied when a patient for any reason declines to persevere in its employment. As a further systematic measure for this purpose I prescribe from one to two drachms of the sulphate of soda, with ten grains of sodium salicylate in a tumbler of *hot* water, to be sipped down every morning on rising. With some, however, the

sodium phosphate is preferred, though I do not think it is as effective as the sulphate. Then, half an hour before each meal, a pill is prescribed of one-twentieth of a grain of bichromate of potash, with three grains of bismuth subcarbonate. Half an hour after meals and at night full doses of intestinal antiseptics in the form of ten grains of phenol bismuth or naphthol bismuth, with ten grains of ammonium benzoate or sodium benzoate, are given in two capsules. While the benzoates are among our best intestinal antiseptics, yet our prescriptions of that nature ought to vary in different cases or at different times in the same case.

Thus, not uncommonly, the signs of intestinal derangement include diarrhœa instead of constipation, and a brief recital from a case in my notes illustrates both how our prescriptions may be varied, and how extensively distributed may be the toxic nervous symptoms of a bad case of migraine.

Mrs. C., aged thirty-five years, came in June, 1899, for early morning diarrhœa of four years' standing. She was frail looking, anæmic and emaciated. Has a great deal of nausea and fears going about alone on account of "spells," when her jaw drops and she becomes unconscious, often for twenty minutes or half an hour, without any twitching; and when she recovers consciousness she feels as if her whole body had lost sensation, except the joints, which all seem to ache together. At other times she has strange feelings come on, with a tight sensation in the jaw which drops, and she has then to sit down at once. She has cramps in the left muscles of the neck, in the right arm and the left leg, with much nocturnal aching in all the extremities. With every one of these attacks she has flashes of rainbow colors till she becomes quite blind; at other times she has for hours a scotoma before the right eye and a distressing dizziness. Her attacks of unconsciousness come on about every three weeks, but the nausea and headache occur between times so often that she rarely passes a well day. She was ordered to abstain altogether from red meats, to take a blue pill twice a week, a pill of one-twentieth grain kal. bichromat. with bismuth before meals, with two drachms of sodium phosphate and ten grains sodium salicylate in hot water on rising, and an hour after meals ten grains each of phenol bismuth and sodium benzoate. In a few weeks she wrote that the last-named capsules made her nauseated. A prescription of

℞ Salol ..... ʒ ij,
Bismuth subgallate ..... ʒ j,
In twenty-four powders,

one-half hour before meals and at night, was substituted, with a dessert spoon of pancreatic emulsion half an hour after meals for her diarrhœa.

The note on August 23 was that she was improved in all respects, with subsidence of all her nervous symptoms. Had only one attack of feeling nervous since last report, and has gained in weight and in color. The last note is February 27, 1900. Looks very well, has no headaches nor any of her old symptoms, but finds that she cannot long omit the blue pill, and

she likes to resort frequently to a prescription of October 15, which was

℞ Salicine ..... ʒ ij,
Ac. benzoini ..... ʒ ss,
Bismuth. subcarb ..... ʒ vss,
In forty-eight powders. Two t. i. d.

Now, this case might easily have been mistaken for epilepsy, but the accompanying symptoms were those of a migrainous toxæmia, and she recovered without taking any bromide. The blue pill, instead of increasing her diarrhœa, seemed to check it, and she always felt better in her general state after it.

One aggravated patient referred to me from an inland city found, during last summer, her attacks much diminished both in frequency and severity (they usually prostrated her for three days), and she gained fifteen pounds in weight; but this September she had two sharp attacks. I changed from the phenol bismuth and benzoate to Dr. M. Allen Starr's prescription of

℞ Sodium sulphocarbol ..... gr. v,
Kal. permangan ..... gr. j,
Betanaphthol ..... gr. j,
After meals and at night,

the capsules being shellac-covered to prevent their solution in the stomach. As she suffers from chronic constipation, she took

℞ Sodium sulphate ..... ʒ j,
Sodium phosphate ..... ℥ iij,
Sodium salicyl ..... ʒ ij,

the dose taken in a full tumbler of water as hot as she could sip it on rising. She took, besides, fifteen grains of the glycerophosphate of soda after meals. I have just received word from her that she feels much improved, and she still particularly praises the effect of the blue pill.

Prophylaxis is the main indication in the treatment of this complaint; but for the attacks themselves, when severe, the fluid extract of ergot given in drachm doses with a drachm of elix. cinchona in water, by stomach or by rectum, is the most certain agent in my experience to cut the attack short. The patient should lie perfectly still after taking it till all pain passes off, and in some cases the dose may be repeated after two or three hours.

In those who cannot take the ergot without vomiting, I rely on ten grains of lactophenin with two grains of caffeine citrate, repeated every two hours until relief occurs; or fifteen grains of antipyrin, always taken with a teaspoon of aromatic spirit of ammonia.

Diet is a matter of great importance, because I believe that in every severe case the red meats should be abstained from altogether, or, at least, never taken at night. In other respects the digestive abilities and inabilities of each patient must be individually studied, as all experienced practitioners well know. Whatever is indigestible for any person is by that person to be avoided, but I find no general rule for this purpose except one, and that is that if any article either of food or of drink is tasted again in an eructation from the stomach, it is a notice from the stomach that it does not want any more of that stuff, and that as a finality.

All nervous functional diseases have their exciting causes as well as their permanent causes. The exciting causes should never be confounded with the permanent causes, as they often are, as if all that we have to do is to prevent them, and then the disease will cease. Now, the commonest exciting cause of migraine is overtaxation of the nervous system, whether by thinking or by feeling, and likewise by undue exertion of the voluntary muscles. On this account, migraine belongs to the worrying and restless periods of life, and then declines with the greater repose of old age. I have been struck in cases of persistence of migraine in elderly persons that it seems always connected with continuance of causes of mental anxiety and depression. It is in them that we have to fear the development of melancholia, and against that dread malady in turn I know of no better prophylactic than the measures for intestinal antisepsis which have been outlined for the treatment of migraine.

### Discussion

Dr. A. Jacobi: Most of the cases of migraine we see are of long standing, many can be traced back to early years. We see nervous women, small, under weight, pale, easily exhausted, sleeping badly and better without a pillow than with one. During her attacks of migraine she is very pale, and is apt to conclude with vomiting. Those symptoms, in my opinion, point to cerebral anæmia. I have seen many such, and believe I have cured some. Aconitia is the remedy on which I rely with them. The only special preparation of which whose efficiency we can rely upon is Duquesnel's aconitia. Cannabis indica, preferably the extract of the drug prepared in England, I have found very valuable. This can be given to the amount of one-half, or in exceptional cases, even one grain daily. Frequently I add small doses of strychnine and arsenic, the former as a tonic, the latter as a nutritive and nerve stimulant.

Dr. Thompson: I have no objection to the treatment of attacks of migraine as outlined by Dr. Jacobi. It is not, however, so much the treatment of the symptoms as of the disease itself that I have referred to. We can relieve the paroxysms of asthma for a lifetime by inhalations of stramonium smoke, but without curing the disease. The treatment I have outlined goes back to the original cause.

# LIX. THE ETIOLOGICAL POTENCY OF HEREDITY IN MENTAL DISEASE

By CARLOS F. MacDONALD, A. M., M. D.
NEW YORK CITY

"Heredity," says Ribot, "is that biological law by which all beings tend to repeat themselves in their descendants: it is for the species what personal identity is for the individual. By it a ground work remains unchanged amid incessant variations; by it Nature ever copies and imitates herself."

"Hereditary transmission," says Spencer, "displayed alike in all the plants we cultivate, in all the animals we breed, and in the human race, applies not only to physical but to psychical peculiarities."

The ancient proverb that "when the fathers have eaten sour grapes the children's teeth are set on edge" doubtless originated in a recognition of the important part which heredity plays in the development of human affairs. "There is a destiny made for a man by his ancestors," says Maudsley, "and no one can elude, were he able to attempt it, the tyranny of his organization."

In truth it may be said that the transmission from parents to offspring of both physical and mental qualities is a fact of universal observation, and that heredity is of far greater potency than environment in shaping a man's destiny in life. Under and by virtue of the operation of this law of nature we constantly see instances of men of obscure and humble origin, who, despite the most adverse conditions of environment, rise and take their places among the rulers of the nation. Striking confirmations of this law are furnished by the lives of Lincoln, Garfield and the lamented McKinley.

"Bless not thyself only," says the author of the *Religio Medici*, "that thou wert born in Athens; but among thy multiplied acknowledgements, lift up one hand to heaven that thou wert born of honest parents, that modesty, humility and veracity, lay in the same egg and came into the world with thee." On the other hand the heredity of morbid tendencies has been recognized "in all times, in every land and in every nation," almost from the foundation of the science and art of medicine. The idea of hereditary disease found apt expression in the ancient but familiar declaration that the sins of the father shall be visited upon the children even unto the third and fourth generations.

The term heredity as applied to the study of mental disease—the term mental disease being here used in its broadest sense,

that is, to include not only insanity proper but all other psychoses, as idiocy, imbecility and psychopathic states of whatever form or nature—implies an original predisposition to the disease transmitted to children from their parents; and while it is true that insanity resulting from hereditary weakness of the nervous system alone without any apparent exciting cause, is comparatively rare, all competent authorities agree that the hereditary nature of insanity has long been recognized as an established fact in medical science, and that heredity plays a most important part in the etiology of this disease through its actual or potential influence upon the nervous organization, whether the tendency descend from direct or collateral branches of the family tree.

This influence usually manifests itself in the progeny in one of three ways: namely, 1, by congenital absence of mind, (idiocy); 2, arrest of mental development in early life before full mental power has been attained, (imbecility); or, 3, the development of a psychoneurotic temperament or insane diathesis which expresses itself in a defective or unstable nervous or mental organization which in turn predisposes the individual to succumb to circumstances in the nature of so-called exciting causes that would not affect a person of innate stable constitution. That is to say, if an individual having a strong hereditary predisposition to insanity and another who inherits no such tendency be subjected to the same or to substantially similar exciting causes, as, for instance, domestic afflictions, loss of fortune, severe mental strain and worry, ill-health, child-birth, dissipation, excesses, etc., the former would be likely to suffer a mental breakdown, whereas the latter would not; and while it is true in respect to the transmission of psychopathic tendencies that the ancestral taint may be, and frequently is, transformed in the progeny so as to appear in an entirely different form, or it may remain dormant in the second generation to reappear in a later one, or it may be deflected from the direct line of descent to a collateral branch, it is destined to crop out from time to time in one form or another, until it is finally rendered inert through the attenuating influence of wise intermarriages, or until the family becomes extinct through the sterilizing effect of degenerative processes going on through generations.

"He who inherits a predisposition to insanity," says Maudsley, "does not necessarily get it from a parent who happens to be insane—no, not even though his father was insane when he was begotten, or though in madness his mother conceived him. He gets it from where his parent got it—from the insane strain in the family stock."

Unfortunately, in the present state of our knowledge, the *modus operandi* of hereditary action is not definitely determined. But we do know to a certainty that the effect of hereditary influence upon the individual is to render his brain inherently unstable, and thereby susceptible to influences, in the nature of so-called exciting causes, which would be quite inoperative in individuals of inherent brain stability. In fact, experience has amply shown that the progeny of insane or neurotic ancestry are distinctly more liable to develop mental disease under the ordinary conditions of life, than are individuals whose ancestry is devoid of insane or neurotic taint.

An examination, even cursorily, of the published statistics relative to the etiology of insanity, will show them to be of small value, owing to the divergent views of collectors respecting the etiological importance of heredity in mental disease and also to the great difficulty of obtaining reliable data as to the heredity of families, the friends of insane patients being reluctant, usually, to admit, even to themselves, the existence in the family stock of a psychoneurotic strain. According to the statistical tables contained in the official reports of hospitals for the insane, the percentage of cases ascribed to hereditary influences varies from 25 to 90, the average for all countries being about 60 per cent. The conclusion to be drawn from these statistics, if accepted, would lead us to greatly underrate the importance of heredity as an etiological factor, whereas the fact is, its importance could scarcely be overrated. In other words, heredity is by far the most important factor with which we have to deal in any consideration of the causation of insanity.

"The tendency of late years," says Mercier, "has been to lay increasing emphasis upon the hereditary factor in the production of insanity, but it is doubtful whether, even yet, the true bearing and significance of this factor have been recognized." Another recent writer on mental diseases (Berkley), referring to predisposition, says: "This tendency, although it may sometimes be acquired, is much more frequently born with the individual, so that in the majority of the mentally afflicted we find a directly inherited predisposition to insanity."

Contrary to generally accepted medical opinion, as enunciated in the writings of alienists, the writer believes that the so-called exciting causes of insanity play a very unimportant part in the etiology of this disease, except in so far as they may operate to engender a state of brain denutrition, and thus set in motion hitherto latent inherited conditions or tendencies. The study and observation by the writer, during a period of thirty years, of thousands of cases of insanity with reference to causation,

have served to convince him that only those who are predisposed to mental disease, either through inherited or accidental psychoneurosis—as head injury or organic disease of the brain cortex which renders the brain unstable—the latter being comparatively rare—succumb mentally to the influences which are embraced within the category of exciting causes. In support of this claim attention is called to the fact that substantially every individual at sometime during his life is exposed, in many cases repeatedly, to many of the so-called exciting causes of insanity, both mental and physical, and yet, despite this fact, we find that sanity is the rule,—insanity, the exception.

Let us take, for example, that best understood, most hopeless and most fatal of all forms of mental disease, paresis, which authorities are wont to attribute, at least in a vast majority of cases, to brain syphilis, excessive venery and other excesses of an exhausting nature, and how rarely we find a victim of this disease, whose history, on careful inquiry, fails to reveal the existence of an inherited psychopathic taint, either in the direct or collateral lines of descent. On the other hand, how few of those within the knowledge of every experienced practitioner who expose themselves recklessly to the conditions which are regarded as most potent in the production of paresis, ever become affected by that disease. Savage, who regards psychoneurotic predisposition as the chief predisposing cause of insanity, declares his belief that only a certain number of persons are so constituted that they can become insane. (Insanity, George H. Savage, M. D.)

In taking the position that substantially all insanity is due either to inherited or acquired predisposition; that is, that it rarely occurs in individuals who are not predisposed thereto, either through hereditary or accidental psychoneurosis, the writer would by no means imply that every predisposed individual is likely to become insane, even though exposed to exciting causes. On the contrary, many of this class escape through the neutralizing effect of one parent, or through insufficient exposure to exciting causes or through intervention of the law of variation which renders the action of inheritance uncertain. Through the operation of this law the psychopathy of a father or mother may not appear in the descendants until the third generation is reached; or, out of three children hereditarily predisposed one, two or all three may escape. If it were absolutely certain that every one, who is predisposed to insanity, would develop the disease under the influence of exciting causes, we should have less difficulty in making a satisfactory reply when consulted at to the advisability of such persons entering into

marriage contracts, as it would then be our duty to forbid them absolutely.

In conclusion, hereditary predisposition may be regarded as an etiological factor common to all insanities, no matter what the immediate or exciting causes may be; that is, it may act independently as a causative factor or it may act in conjunction with what are denominated exciting causes.

### Discussion.

Dr. William Mabon, of Ogdensburg: Some one has said that the majority of cases of insanity result from a combination of causes, of which the most important is probably heredity. I think we have to consider also collateral inheritances, such as the neurotic and alcoholic. It is very difficult to get reliable information regarding the insane. In many of our public institutions the inmates are from the lower walks of life and are unable to trace their antecedents; among another class the information is withheld because of family pride.

It is undoubtedly true that only a small proportion of cases of insanity arise from heredity *per se*, but it is equally true that its influence on the nervous organism is such that individuals break down from slighter causes than they would if they were free from such a predisposition. I know of one family where the father, mother, sister and brother are insane. In another there is an insane grandfather, grandmother, father, uncle and two aunts. In still another, the father, two brothers, two sisters, an aunt, and several great-aunts and cousins are insane. An insane patient was admitted to the Utica State Asylum in 1843, and up to 1895, when I left there, the wards of that institution never failed to contain one or two members of that family. We all know that certain persons can pass through periods of great stress without going insane, while others break down from very slight cause, and in such cases we cannot fail to reach the conclusion that the cause does not account for the break-down. The majority of them are weaklings, who have inherited from some ancestor a tendency to nervous and mental instability. If such persons would only pay strict attention to moral and physiological laws, in many instances insanity would be averted, and even the tendency toward insanity could be gotten rid of entirely. Many cases of hereditary insanity break down during the physiological crises of life, namely, at the age of puberty and at the climacteric. A curious effect of heredity is the transmission of the same form of mental disease through several generations, or it may assume a different form. In one generation we may have a case of imbecility, a suicide in the next and perhaps puerperal insanity in the third. Or, a member of such a family may not be insane, but simply irritable or highly immoral.

Out of 432 patients admitted to the St. Lawrence State Hospital for the Insane during one year, 155, or 36 per cent., presented a district history of heredity. Of these 155, the transmission had been from the paternal side in 57, from the mother in 64, and from both father and mother in 15,

while 25 had a collateral inheritance. Nothing could be ascertained regarding heredity in 31 per cent.

Dr. Edward D. Fisher: I think this subject, as brought out by Dr. MacDonald, is a very important one. There is, however, another aspect of it that should not be lost sight of, and that is, that all diseases are influenced by heredity, and we should not too much alarm ourselves by the fact that insanity comes under the same category. Cancer, tuberculosis and other diseases are to a certain extent influenced by heredity, and this also applies to insanity. I hardly think that heredity has any more important bearing on insanity that it has on many other diseases. Unless we view the subject in this light, we are apt to be unduly alarmed. There is no large family in which we could not find in either the direct or one of its collateral branches, a case of cancer, insanity or tuberculosis.

I think it is rare to find an example of inherited organic mental disease. The more common examples are of the functional type, melancholia, neurasthenia, etc. It is the unstable mental condition that is inherited. In regard to general paralysis of the insane, it is not my experience that that is hereditary. Many offsprings of such patients do not inherit that disease, in my experience, and the explanation is that it is essentially an acquired disease, not due to inherited syphilis, but to acquired syphilis. It is really the only form of insanity in which we have a definite pathological basis for what we find. There are definite pathological lesions, and anyone of us can or may get the disease, but we cannot get it by simply inheriting it. There is an acquired cause. There are certain cases of general paralysis of the insane which we canot class under the head of syphilitic, but as a rule, that is the etiological factor. Therefore, I would not lay too much stress on heredity as a factor in insanity.

Dr. MacDonald: (Closing the discussion). In reply to Dr. Fisher, I would say that I did not intend to imply in my paper that paresis was inherited or that any other form of insanity was inherited. The point I wished to make was that persons who were not predisposed to mental or nervous disease by reason of inheritance, seldom broke down under the exciting causes of paresis. Among the vast number of syphilitics, how few become insane. It is only the tendency that is inherited.

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## LX. THE OBESITY OF ADOLESCENCE

By HEINRICH STERN, Ph. D., M. D.

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Studying polysarcia of adolescence we are confronted with the fact that in some cases the obesity gradually declines toward the close of the second or at the beginning of the third decennary of life, while in others it continues to exist after attainment of maturity. This circumstance seems to be of ætiological importance.

The underlying causes in instances persisting after completion of growth are, without much doubt, analogous to those giving rise to obesity in the adult; but in such cases where polysarcia ceases during, or at the end of, the period of adolescence, its origin in the great majority of instances must be attributed to factors of a different nature.

Naturally, these post-facts cannot serve as a means of classification and diagnosis of a case presenting itself for examination; however, they enable us to recognize and to describe two different forms of the affection. Those cases of obesity abiding after individual development I shall classify among the "metabolic," and as "transitory" or "specific" those which subside with the approach of adult life.

The origin of the metabolic form occasionally antecedes the period of puberty. A fat child of six or seven years may retain its corpulency during after life. In other instances, the child may have been stout before the seventh or eighth year, and from then on may have declined in weight and rotundity until the age of puberty was reached. Notwithstanding an inclination to stoutness in a number of children, metabolic obesity usually does not set in before the tenth or twelfth year.[1]

The transitory form always makes its appearance with the approaching state of puberty, and, as it again vanishes during or at the close of adolescent life, we may well term it the specific obesity of adolescence.

The metabolic, as well as the specific, form occurs in both sexes. However, I have found the metabolic variety more frequently among boys, while the specific form certainly predominates among girls.

Metabolic obesity of adolescence is virtually nothing else but a juvenile modification of that which I have described as metabolic obesity in the adult. Under the latter form I understand that condition in which polysarcia concurs with a normal or slightly subnormal degree of body-density.[2] It is the most common of all types of polysarcia and is always due either to excessive ingestion of nutriment, or to insufficient oxidation in the organism, or to both these eventualities together.

A close investigation of the individual cases will evince that a caloric value of the nourishment usually ingested far exceeds the needs of the organism. The caloric demand of the youthful body for the maintenance of its metabolic equilibrium per kilogramme of body-weight and under like conditions is the same as that of the adult organism. Normally there are utilized on food stuffs for each kilogramme of body-weight in twenty-four hours: when at absolute rest, thirty calories, of which 4.1 cal-

ories should be yielded by albumin; when leisurely occupied, thirty-five calories, of which five calories should be yielded by albumin; when moderately active, forty calories, of which 6.1 calories should be yielded by albumin; when laboring strenuously, forty-five calories, of which 7.2 calories should be yielded by albumin.

As, however, the adolescent individual but rarely performs very hard labor, its needs of nourishment practically never exceed a value of forty calories to the day and kilogramme of body-weight.

In the well nourished adult, lack of exercise alone resulting in diminished oxidation, and therefore in increased fat deposition, stands often at the foundation of metabolic obesity. This factor hardly ever plays an important rôle in the production of metabolic polysarcia during the period of systemic development, an age when recreation is deemed synonymous with outdoor games, sports of all kinds, dancing, and so on.

Metabolic obesity during infancy or adolescence may, in some exceptional instances, be the consequence of a preexisting or an acquired systemic anomaly. Hence we may assume a predisposition to polysarcia in some individuals. The vast majority of cases, however, where all or nearly all living members of a family, from the grandparents down, are affected with metabolic obesity, are not due to an inherited inclination or diathesis, but to the same mode of living pursued by every member of the family, *i. e.*, to a similar degree of superalimentation or body inactivity, or to a combination of these two factors.

While metabolic obesity in the adult, on account of the various concomitant disorders, must be regarded as an expression of a certain degree of systemic deterioration, its occurrence during adolescence is not indicative of any important or specific organic changes. The condition during youth almost always lacks the characteristic symptoms which it exhibits when occurring in a more advanced period of life. On this account its recognition and proper classification are possible only on the basis of the history of the case and by determining the caloric value of the food habitually ingested. If it is found that in accordance with the amount of work performed the nourishment yields more than 30, 35, or 40 calories respectively, to the day and kilogramme of body-weight, it may be concluded that the obesity present is of the metabolic type. Normal or almost normal corporeal specific gravity, although characteristic of metabolic obesity, is no absolute indication of the latter's presence during youth, as many cases of specific obesity of adolescence exhibit no abnormal blood or body densities. The surplus in absolute weight in metabolic

obesity during youth, as in adult life, depending entirely upon amount and quality of nourishment and the degree of oxidation in the organism, naturally varies greatly in individual cases. It may amount to 15 or 25 per cent., but it may be increased to 50 per cent., and even more.

While metabolic obesity may exist during any or all periods of life, transitory obesity of adolescence is a specific condition whose occurrence is limited to the latter stage. It must be understood, however, that similar ætiological factors which are productive of adiposis during youth may also occur at other periods of life, particularly at such times when constitutional changes take place. There is little doubt that transitory obesity of adolescence is caused by certain metamorphotic anomalies incidental to pubescence and disappearing before or at the completion of systemic development. Such anomalies are also apt to occur at the climacteric age of women, and after orchidectomy and oöphorectomy; in short, as the consequence of pronounced alterations in the organism. The anomalies produce various disorders and abnormal conditions, among which adiposis interests us most at this moment.

Thus, faulty activity of the same organ or organs may be at the bottom of lipomatosis during various phases of life; as, however, the obesity in adult persons or in those advanced in years is more a manifestation of decline of functional activity, while in the adolescent it is but a developmental disturbance, the transitory form of obesity of adolescence may well be designated as a specific type.

The greater frequency of the specific form among girls explains itself by the fact that the changes occurring at the period of puberty are much more decisive in the female than in the male organism. Superalimentation does not play any part in the production of the specific type. On the contrary, I know of instances where the caloric value of the nourishment generally partaken of was unusually small. Moreover, anorexia is not infrequently met with. The appetite is often capricious. While, in the majority of instances, the heat- and fat-producing ingesta are given preference by the adolescent individual affected with this type of obesity, this is not always the case, and I remember some instances where even an aversion existed for carbohydrates or hydrocarbons or for both.

Again, as superalimentation is not a causative factor of specific obesity of adolescence, this must be due to diminished intra-organic oxidation. One of the anomalies underlying the latter we are quite justified in seeking in a retarded or otherwise perverted function of the thyreoids (or parathyreoids, or of both?).

My reasons for ascribing the catabolic disorders to faulty thyreoid (or parathyreoid) activity, are: first, disappearance of the thymus gland and marked development of the thyreoids at the period of puberty; second, the more frequent occurrence of thyreoid affections in girls than in boys, which fact tends to explain the analogue, greater frequency of transitory obesity of adolescence among the pubescent female; and, third, our physiological and clinical experience as regards increase in protoplasm oxidation after administration of thyreoid gland or its preparations.

Most cases of transitory obesity run an uneventful course. Anorexia, chlorosis, constipation, headache, and dull pains in back and loins are often present; a sense of rigidity in the joints and sacrolumbar region, giving rise to ungraceful and awkward motions, is not uncommon; circulatory disturbances synchronously produced with transitory obesity or appearing during the course of the latter, are not very frequent and seem comparatively slight; however, preexisting anomalies of the circulatory apparatus may occasionally become decidedly aggravated after abnormal fat deposition. In severe cases we may meet with pronounced anæmia or leucocytosis; and in rare instances with vertigo and cardiac dyspnœa.

The specific gravity of the blood and consequently that of the body are not pathognomonic of the condition. That is, they do not as a general rule differ materially from those in metabolic obesity of adolescence. Some cases tend to what I have described as hydroplasmic obesity,[3] a condition of lipomatosis characterized by low blood density and lesser volume weight of the organism. Typical cases of hydroplasmic obesity are the result of a decided systemic deterioration, and are, therefore, of but exceptional occurrence during adolescence. There may be instances in which a specific type of polysarcia has apparently lost its transitory character. This may occur after an intercurrent disease, as enteric fever, or after an accident or affection favoring or provoking metabolic or hydroplasmic obesity. Thus, if a case of the latter type of adiposis is said to have originated during adolescence, I am of the opinion that it is almost always an instance of transformation from the metabolic to the hydroplasmic form, or that its occurrence was preceded by transitory obesity of adolescence, with which condition it does not stand in any true relationship.[4]

The excess in absolute weight in transitory obesity of adolescence amounts on the average to about 25 or 30 per cent. It may, however, vary a good deal in different cases. A patient of mine affected with the condition, a girl thirteen years of age, weighed over 200 pounds.

It occurs to me that in this form of obesity deposition of fat is more frequent upon the chest, breasts, and extremities, while, in the metabolic variety, it principally gathers in and upon the abdomen, in the region of the hips, and on the buttocks.

Another observation I have made in a number of obese girls is that in the specific form of the affection the hair of the head is full and attains great length, while it is much less abundant and comparatively short in metabolic obesity.

Both forms of juvenile obesity only demand treatment either when the overweight is so excessive as to interfere with the function of certain organs, or in the presence of grave concomitant disorders. Uncomplicated cases of less than 30 per cent. overweight are better not subjected to any continuous treatment, as this will always produce more or less pronounced disturbances in the developing organism. Treatment, if instituted at all in such cases, should be directed toward maintenance of the individual's present body-weight. It should be of such a nature as to prevent protoplasm decline on the one side, and further accumulation of fat on the other side.

If, in other members of the family, metabolic obesity has already appeared at an early age, or if it is soon recognized after its onset, a proper preventive treatment conscientiously executed will avert its formation altogether or materially influence its progress. The preventive treatment of the metabolic form, which must be preeminently a dietetic one, will be of no avail in checking the course of transitory obesity, and as this is the result of certain detrimental anomalies, I do not see by what means we may in the early stages intercept its progressive tendency.

Juvenile metabolic obesity in which treatment is indicated should be subjected to about the same dietetic regulations as if it were metabolic obesity in the adult. Successfully to combat metabolic obesity in the adolescent and yet to prevent the consumption of body-albumin, the caloric value of the nutriment should amount to 30 to the day and kilogramme of body-weight. This is a somewhat higher amount than that needed in the treatment of such cases occurring in the adult; it is necessary because, first, a marked reduction in nourishment is usually not well borne by the growing individual for any length of time; secondly, the youthful obese, as a general rule, is more actively engaged in physical exercise, and, thirdly, the percentage of over-weight in most cases is less than in cases occurring in the adult.

To determine the necessary amount of calories, the height of the patient, and with the assistance of the appended table the corresponding weight in kilogrammes, should be ascertained.

Ignoring the absolute weight of the patient, the number of kilogrammes thus obtained should be multiplied by 30, for instance:

Boy, aged sixteen, absolute weight, 72 kilogrammes, height

AUTHOR'S TABLE DENOTING MEAN HEIGHT AND WEIGHT OF BOTH SEXES IN THE DIFFERENT AGES OF LIFE IN THE UNITED STATES

| Age. | Men. | | | | Women. | | | |
|---|---|---|---|---|---|---|---|---|
| | Body, inches. | Height, ctm. | Body, pounds. | Weight, kilo. | Body, inches. | Height, ctm. | Body, pounds. | Weight, kilo. |
| 1..... | 28.74 | 73 | 21.78 | 9.9 | 28.50 | 72.4 | 20.24 | 9.2 |
| 2..... | 32.67 | 83 | 28.16 | 12.8 | 32.44 | 82.4 | 24.60 | 11.2 |
| 3..... | 35.82 | 91 | 32.70 | 14.9 | 35.59 | 90.4 | 29.04 | 13.2 |
| 4..... | 38.18 | 97 | 36.68 | 16.9 | 37.95 | 96.4 | 33. | 15. |
| 5..... | 40.55 | 103 | 39.60 | 18.0 | 40.31 | 102.4 | 35.20 | 16.5 |
| 6..... | 42.91 | 109 | 43.34 | 19.7 | 42.68 | 108.4 | 38.50 | 17.5 |
| 7..... | 45.27 | 115 | 47.08 | 21.4 | 45.04 | 114.4 | 41.58 | 18.9 |
| 8..... | 47.63 | 121 | 51.7 | 23.5 | 47.40 | 120.4 | 40.92 | 18.6 |
| 9..... | 50. | 127 | 55.60 | 25.3 | 49.76 | 126.4 | 49.06 | 22.3 |
| 10..... | 52.36 | 133 | 60.94 | 27.7 | 52.13 | 132.4 | 54.56 | 24.8 |
| 11..... | 54.33 | 138 | 66.40 | 30.2 | 54.09 | 137.4 | 58.52 | 26.6 |
| 12..... | 56.30 | 143 | 72.60 | 33. | 56.06 | 142.4 | 67.98 | 30.9 |
| 13..... | 58.27 | 148 | 78.10 | 35.5 | 58.03 | 147.4 | 77.44 | 35.2 |
| 14..... | 59.84 | 152 | 84.40 | 38.4 | 59.60 | 151.4 | 87.34 | 39.7 |
| 15..... | 61.42 | 156 | 105.80 | 48.1 | 59.84 | 152. | 97.02 | 44.1 |
| 16..... | 63.39 | 161 | 120.10 | 54.6 | 60. | 152.4 | 97.46 | 44.3 |
| 17..... | 65.35 | 166 | 132.80 | 60.4 | 60.39 | 153.4 | .... | ... |
| 18..... | 66.93 | 170 | 136.40 | 62. | 61.18 | 155.4 | .... | ... |
| 19..... | 67.32 | 171 | 138.60 | 63. | 61.84 | 157. | 118.80 | 54. |
| 20..... | 67.72 | 172 | 144.10 | 65.5 | 62.36 | 158.4 | 122.10 | 55.5 |
| 25..... | 68.90 | 175 | 151.80 | 69. | 63.15 | 160.4 | 124.30 | 56.5 |
| 30..... | 69.29 | 176 | 154. | 70. | 63.78 | 162. | 124.30 | 56.5 |
| 35..... | 68.90 | 175 | 157.30 | 71.5 | 63.54 | 161.4 | 127.60 | 58. |
| 40..... | 68.90 | 175 | 166.60 | 73. | 63.39 | 161. | 133.10 | 60.5 |
| 45..... | 68.11 | 173 | 161.70 | 73.5 | 62.99 | 160. | 132. | 60. |
| 50..... | 67.72 | 172 | 156.20 | 71. | 61.81 | 157. | 128.70 | 58.5 |
| 55..... | 67.32 | 171 | 151.80 | 69. | 61.42 | 156. | 126.50 | 57.5 |
| 60..... | 66.93 | 170 | 149.60 | 68. | 61.02 | 155. | 126.50 | 57.5 |
| 70..... | 66.14 | 168 | 145.20 | 66. | 60.23 | 153. | 117.70 | 53.5 |

165 centimetres. Normal weight corresponding to 165 centimetres = 60 kilogrammes, therefore $60 \times 30 = 1{,}800$ calories, which should be daily yielded by the prescribed nourishment.

The amount of liquids to be taken should be the same as I have calculated for the adult in this condition, that is 45 cubic centimetres to the day and kilogramme of normal weight.

The dietetic treatment alone will suffice in most instances. In other cases an increased amount of exercise, gymnastics of the lungs, massage, hydrotherapeutic and other measures, must be resorted to in addition to the former. Medicine should be administered, if at all, only for the accompanying disorders, and never for the reduction of metabolic obesity during adolescence.

In cases of transitory obesity demanding treatment, dietetic restrictions are not only superfluous in the vast majority of cases, but often effect lasting injury to the youthful organism. Our therapeutic efforts in such instances should be directed rather to that of the complications and concomitant disturbances than to the obese condition itself. The latter, if extreme and giving cause for alarm, may be treated by preparations of thyreoid. A safe form of administering thyreoid substance, a tablet which I have made use of for a number of years, is this:

℞ Arsenious acid ..... 0.001 = $\frac{1}{60}$ grain;
Adonidin ..... 0.005 = $\frac{1}{12}$ "
Thyreoid gland, dry powder... 0.12 = 2 grains.
M. ft. C. T. No. 1.

Physical treatment, in any of its branches, may be of benefit in individual cases of transitory obesity.

1. Metabolic obesity of early infancy, due to over-feeding, artificial foods rich in carbohydrates, and the long periods of sleep, disappears as a general rule when the infant is put on a different diet and when it starts to walk.

2. The methods which I employ in determining the volume-weight of the living organism were published in my articles on Investigations upon Corporeal Specific Gravity, and upon the Value of this Factor in Physical Diagnosis (*Medical Record*, February 9, 1901), and On the Treatment of Obesity (*Journal of American Medical Association*, February 15, 1902,) to both of which I refer the reader.

3. *Loc. cit.* (On the Treatment of Obesity.)

4. Specific obesity of adolescence ceases with the close of that period, but, as a matter of fact, in most instances it has already disappeared before that time. One could surmise that the continued existence of its underlying causes would also favor its continuation beyond that period, This seems true, but if the underlying anomalies are of a severe and lasting nature, the adolescent individual will succumb to them long before the attainment of maturity.

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## LXI. A SMALLPOX EPIDEMIC IN AN ORPHANAGE

By F. C. CURTIS, M. D.
AND
HENRY L. K. SHAW, M. D.
ALBANY

A TYPE of smallpox of almost universal prevalence commenced in 1898 and being generally abnormal by reason of its mildness brought forth many expressions of doubt as to its true variola character. Clinical observations of this anomalous type of the disease are therefore eminently desirable. The epidemic we have to report illustrates so very well the most extreme possible variations from the normal, together with undoubted proof of its

variolous nature, that it constitutes a distinct contribution to this study.

The outbreak occurred in the Lathrop Memorial, Albany, a branch of the larger Albany Orphan Asylum, sheltering from forty to fifty small children. Smallpox was at the time prevalent in the city, but a direct contagion to the first case in the orphanage could not be traced. The case occurred on March 17, 1900, in a child who was not seen by a physician nor isolated as the matron regarded the eruption as that of chickenpox. Between March 31, and April 4 forty-seven cases developed, seventeen of them being taken almost simultaneously on April 1. The onset was invariably sudden and was attended in the severer cases by vomiting, nausea, restlessness, pains in head and back and high fever. The eruption generally put in an appearance on the third day and with it came an abatement of all the symptoms.

The history of one of the severe cases and of the mildest case among the children will give some idea of the clinical picture seen in this epidemic.

Bertram B., colored, age seven, was taken ill on April 1 with severe vomiting. The temperature was 105° F., and the child seemed very sick. The vomiting, temperature and prostration continued until April 3, when the rash appeared on the face and hands. A note made on April 7 reads that the eruption is abundant and close set on the face, arms and hands and a number of lesions appear on the palms and soles. On the back particularly but less on front of trunk are turbid full rounded vesicles on hardened bases. The child seems ill and depressed and shrinks from pressure on lesions. Temperature 98.5° F. April 8: The lesions are fuller and larger; the child complains more of pain and cries when touched or moved; there is very slight tendency to scratch lesions; temperature 101.2° F. April 10: Arms and legs show typical small-pox; the lesions on the face are aborted and are drying; the eruption is sparse on the chest and trunk, but the face, arms and legs are covered; several of the spots have coalesced on the arms and legs, making a few lesions about the size of a ten-cent piece. April 15: The child is dressed and appears perfectly well; the eruption is drying and the scabs are falling off. The child was vaccinated on April 7 during the height of the disease with no effect.

The lightest case was that of John C., age eight. He had had chickenpox the year before and a few pock marks were visible on the face. He appeared somewhat drowsy and stupid on the 4th of April, but did not vomit or complain of pain. There was no rise of temperature. Two days later three spots appeared. One was on the forehead, one on the back of the left hand and one on the right thigh. This child was not confined in bed and appeared perfectly well. Vaccination on April 9 was negative.

The youngest case occurred in an infant two years old who had had chickenpox but who had never been vaccinated. This

child had mingled freely with the rest. She had no noticeable preliminary fever which is very remarkable and her only symptoms were the cutaneous lesions which appeared at the same time as the others.

In forty cases of moderate severity the onset was sudden and was accompanied in nearly every instance with vomiting and more or less fever. These children were not sick enough to remain in bed but were sluggish, drowsy and disinclined to play. The temperature rose to 102° F. and over in seventy per cent. of these cases during the first twenty-four hours, but it generally fell the next day to a degree or two above normal and disappeared on the third day when in the great majority of cases the rash first appeared.

*The skin lesions.* These appeared on the third day, counting from the onset of initial fever which was generally abrupt and severe, though lasting sometimes only a day and always abating with the appearance of the eruption. As to location, it was generally that of smallpox, most abundant on the face, forearm, upper dorsum, very often on the palms and soles, the scalp and fauces, but seldom on the abdomen and legs. The number of lesions varied from three to a sparse, scattered eruption on the sites of election. The character of the lesions on April 7, which was the second to fourth day of eruption in a considerable number, was chiefly that of a vesicle varying in size from a pin head to half a split pea, though all lesions seemed of the same age and not coming in crops. The papular quality of these vesicles, that is showing hardness to the touch, was very ill defined though generally to some degree appreciable, never characteristically, and often very slight indeed. Some lesions were simply small macules with an ill defined papular quality which never advanced to the stage of a vesicle. The further evolution of these lesions, with the exception of two children, consisted in the drying down of the vesicles and the persistence of a certain induration and stain, which latter continued for three weeks or more in the better marked cases. Two children and two adults only had characteristic lesions and a typical course of moderately severe smallpox. They had fairly severe fever, an eruption close set on the face, forearm, palms and soles, with full rounded, pea-sized vesicles on hardened base, becoming pustular and running a fairly typical course.

The diagnosis from the lesions alone could hardly have been made in the forty-two cases of mildest expression of the disease. It would rest on the judgment as to the value of the papular quality of the lesions and the election of site. It is the rarest thing for varicella lesions to show on the palms. The character

of the onset of the initial fever and the third day appearance of the lesions would justify the diagnosis of the majority of them.

*Vaccination.* Of the forty-five children in the institution only one had been vaccinated, and that one alone failed to take the disease. Of nine adults, six had been vaccinated and did not contract the disease. Three had never been vaccinated, one of whom was successfully vaccinated when first exposed and did not contract smallpox, and two had the disease, in one of whom it ran a severe course. Several of the adults had only been vaccinated once and then in early childhood so that infancy vaccination afforded sufficient protection. All the children were vaccinated during their sickness and some a second time on recovery, but the result was negative in every instance. The virus used was from a lot which produced ninety-five per cent. of successful vaccinations in the larger orphanage.

A point having diagnostic value is that a pretty general epidemic of varicella occurred the year before among these children leaving scars in several of the cases.

There were no deaths, complications or sequelæ and in only one case were any scars left.

The question naturally arises if this is an intermediate disease like roetheln or the proposed "fourth" disease, as has sometimes been advocated. We think that it is unnecessary and unsafe to allow this. While it largely follows a type *sui generis*, its characteristics are essentially those of variola, abortive in character and mild but with true unmodified variola occasionally appearing among the mild forms.

The proof is unquestionable that the epidemic was one of smallpox and unmodified by vaccination. The protective value of vaccination is conclusive as to its nature. Further proof is that of severity of onset, following an incubation period from the onset of the first case of fourteen to eighteen days; an initial fever of three days; defervescence of symptoms when the eruption appeared; the essential nature of the lesions, and the fact that every unvaccinated person contracted the disease and no vaccinated person took it.

The interest lies in the abnormality of this extensive and easily observed outbreak of smallpox by reason of its general extraordinary mildness.

# LXII. INDIAN MEDICINE

By NELSON W. WILSON, M. D.
BUFFALO

In presenting to you some of the phases of Indian medicine, I wish to disclaim any pretense to being a student of Indian practices. I merely tell what I saw and learned of a most interesting method of practicing medicine among the Red men during a six months' association with the Sioux Indians* and their really remarkable medicine man and his mysterious medical ways.

Whatever one may say of Indian medicine men they must as a class be given credit for earnestness and a superior sort of intelligence, and while it must be admitted that some of their practices and methods are strongly flavored with a tinge of Christian science and allied fakes, their prayers are used merely to add to the efficacy of the drugs which they administer or the massaging which they practice, and are the natural result of superstition inborn generation after generation. In explanation of this it is well to know that the Indian looks at everything upside down, so to speak, and he is imitative. The medicine man occupies a unique position in his tribe. His work is not strictly confined to the practice of medicine; he is a man of consequence and his fastings and his prayers and his self-denials make him, in the eyes of his people, a man who is in close communion with the spirits of the air and the waters and the elements.

The Cheyenne, or Black Apache medicine man, for instance, when a storm arises in the mountains above the camp, sprinkles about the ground and tosses into the air handfuls of corn meal and dances and prays that the storm may remain in the mountains and not come down into the valley to destroy the crops or the homes of his people. Corn meal is used because it is quite nearly sacred in the eyes of an Indian. Corn is a gift of the gods and it is what gives the tribe life; and if they make an offering of what gives them life, they argue that the gods will turn the storm that they may not die. They believe that the earth is peopled by beasts and gods. To the Indian the animals, the snakes, the birds, the fish and every living thing which is not human is a god and the men are the beasts. And they have reached this conclusion by a simple method of reasoning. Look, they say, a bird flies through the air; if a man tried to do that he would be killed; a snake moves along the ground on his belly, that a man cannot do; fish live in water, if a man did that he

* As Sanitary Officer, Pan-American Exhibition.

would be drowned; hence all these things are gods and because man cannot do what they do and live he is a beast.

One of the most interesting features of the Pan-American Exposition was the Indian Congress, where lived in all their glory of dirt, gaudy dress and laziness, some 200 Indians of various tribes. They lived there as they lived on the plains, in tepees; they cooked their food over camp fires, the squaws did all the work and the men smoked cigarettes and posed for the kodak fiend when they were not gambling. It was all very pretty and picturesque, the only feature of savage life lacking being the scalping of the pale face. The simple-minded red man made up for this, however, by skinning his beloved white brother every time he sold him a piece of bead work or a handful of feathers.

As sanitary officer of the exposition it was a part of my duty to watch over the health and living methods of the various natives on the Midway. I visited each village several times a day and while I was tolerated in the Philippines, welcomed in Venice, damned in Damascus and cursed in Cairo, the Indians looked upon me by virtue of my office as a chief and treated me as such, respecting and obeying orders regarding health matters. Not many days had passed before it was generally understood that I was a medicine man and the medicine man of the tribes, War Bonnet, a grave and dignified old Indian, sought me out and through an interpreter, begged in the flowery language of the Sioux, that I honor him by a visit to his tepee.

I will confess that my curiosity to learn something of War Bonnet's methods had quite as much to do with my acceptance of the invitation, as my sense of professional courtesy. I smoked the long pipe and spent a very pleasant half hour with the distinguished old Indian, who for the time cast aside all professional reserve and so far unbended as to tell me how many people he had raised from the dead, and of some marvelous cures he had wrought. I gave him a slight token of my esteem and regard and from that day was War Bonnet's "brother."

I wanted to see as much of Indian medicine as possible and to that end had all sick Indians report to me each morning. For the first few weeks there was nothing more serious than colds, headaches and indigestion. Then Rocky Bear, a sub-chief, broke his leg and was sent to a city hospital. He was properly cared for, but the next day demanded to be returned to his tribe and was brought back. The same night when I visited him I found the dressing had been removed and that War Bonnet was in attendance. The interpreter told me I could not stay because the medicine man was working. Rocky Bear

grunted "How" and held out his hand, and War Bonnet, speaking in Sioux to the interpreter, said I was a medicine man and his brother and should remain; but that Rocky Bear wanted Indian medicine. War Bonnet's medicine case—a buckskin bag—was on the ground beside the fire. It was filled with smaller bags containing coarse and fine powders, dried roots and leaves and some chunks of what looked like suet. There was the back of a turtle shell, a tin can of fat and the skull, with beak attached, of a red-head woodpecker.

In sign talk Rocky Bear informed me that he had had much pain in his leg and that he had not slept; that War Bonnet was going to take all the pain away and put him to sleep. The medicine man had a pan of coals by his side. Over this he warmed his hands after smearing the palms with grease, which I afterwards learned was bear fat; he dipped his fingers into a little bag containing a greenish powder and mixed it with the grease, then into a bag of white powder which he also mixed up. With this he rubbed the broken leg, carefully, gently, all the while chanting a weird but not unmusical song. Occasionally he would change the powders. In ten or fifteen minutes Rocky Bear said his pain was gone. In half an hour he was drowsy and before we left a short time after, he was asleep. Before leaving the tepee War Bonnet bound up the leg with a splint and thongs.

I could never get a very definite idea regarding the character of his powders other than that he made them from roots, herbs and portions of animals and birds. Twice a day he treated Rocky Bear and when the latter went back to the reservation he had a pretty good leg. There was a continued use of the splint and I must say for War Bonnet that he put that leg up in a well-approved fashion.

In explaining the treatment to me afterwards he said that he used the splint to keep the bones together and that he took it off and rubbed the leg to let the blood get through and to keep the leg alive, adding wisely that if the splint was left on, the leg would die.

Just about this time I had a unique experience with Indian humor. In spite of his reserve the Indian is full to overflowing with wit and he uses it in a most unaffected manner. A dignified chief is quite as apt to be the victim of a joke as the tribal fool. While they respect dignity it is no bar to the perpetration of a witticism. I carried with me on my rounds a small medicine case containing tablets. One morning when I was hearing the complaints of those who were not well, there was a great deal of giggling among the squaws following a monologue

by Yellow Shirt. The interpreter answered him. Yellow Shirt again spoke and there was a general laugh. I smiled in a companionable sort of way, wondering who the victim was, and asked the interpreter.

"It's nothing," he said, but his eyes twinkled and I insisted.

"It's pills," he said.

"Pills?"

Yes. They say: "Pills, pills, pills. Pills for headache; pills for cold; pills for fever; pills for the bowels when they move too much; pills for the bowels when they don't move at all; it's pills, pills, pills."

"Nothing funny in that," I said.

"No. Yellow Shirt say give Katy White Deer pills for a baby. That's the joke."

Katy White Deer, it might be remarked parenthetically was an old maid and the language she used toward Yellow Shirt was never taught her at the mission back on the plains.

The Indian does not want pills or tablets. He wants liquid medicine and he wants it so he can taste it and remember the taste after he has taken it. The worse it is the better he likes it.

During the mid-exposition period there appeared at the Indian Congress a coterie of women from the red-light district and it was not long before a number of the bucks had picked up the white man's burden, and were on the sick list with gonorrhea and all its complications. Those who were so fortunate as to contract the disease early in the rush received Indian medicine from War Bonnet—a tea made of the chimiwoya leaves, or mountain rush. In the west this is known as "clap weed" and the decoction as "mormon tea." It was drunk in large quantities and arrested the discharge in remarkably short time. The supply on hand was soon used up and more was sent for. This found patients awaiting its arrival.

I do not mean by this to reflect on the morals of the Indian. He is not immoral in the general sense of the term. So long as he is single he will go a-visiting and a-courting, but seldom or never in his own tribe unless he is looking for a bride. His pasture of pleasure is far removed from that in which his own sheep are flocked. But once married his ideas of morality become rigid.

A man came to me with a painful and enlarged inguinal gland. I inquired concerning gonorrhea, and the interpreter, surprised, answered: "Of course, he hasn't had it. He has been married ten years." So sure are they of one another in this respect that the interpreter absolutely refused to question the man concerning venereal disease.

When it became an assured fact that War Bonnet had confidence in his "white brother," I ventured to ask questions concerning his practice and the material he used. There were some things which he could not or would not tell me of, for example the process he used to produce sleep. He claimed to be able to keep a person asleep for a week without ill-effect and the interpreters told me they had seen such things done many times. The woodpecker skull and beak he used to mix medicines in the turtle shell. There is supposed to be some sort of special virtue in the woodpecker when it happens to be a red head, not only in medicine but in the making of charms and ornaments. The bear grease was used merely as a base for his ointments, the powders added being lizards, fish, various parts of animals and birds; pulverized leaves, roots and flowers. There was one powder, coarse and grayish white which was more highly prized than all the rest of the stuff which War Bonnet carried. This was said to be the bones of an animal "like the elephant, only bigger, much bigger," as the interpreter put it. These bones are found deep down in the ground in the foot hills and the location is known only to the medicine men of the different tribes. There was, too, a paste which was strangely like ichthyol in odor and color.

When Baby Johnny Ghost Dog died of an inspiration pneumonia brought on by the inhalation of grains of partially cooked rice, he was in the exposition hospital. War Bonnet had not treated him at all and took advantage of that fact to impress on the minds of the tribe the presence of an evil spirit on the grounds,—a spirit which only he could exercise. A few days later Mary Pretty Boy, a three-year old child, was seized with convulsions. I was in the camp at the time and one of the interpreters called me. In the tepee the father sat holding the child across his knee. The mother had run away in a panic of fright when the baby was taken sick and a neighbor had gone to hunt up War Bonnet. The father refused to allow me to treat the child, saying only War Bonnet should give medicine. I said the baby must be taken to the hospital.

"No," said Pretty Boy. "The evil spirit lives there. It is death for babies to go there, for the evil spirit killed Johnny Ghost Dog. War Bonnet will make her well." His confidence in the medicine man was sublime, his faith childlike.

Outside, mingled with the crashing of the band and the crack of rifles in the sham battle could be heard the voice of Seven Rabbits, the spokesman of the tribe—a sort of town crier—calling for War Bonnet. His voice, usually a drawling monotone, now rose and fell and the words were snapped out. Then

the soft patter of moccasined feet, the flap of the tepee was brushed aside and War Bonnet tumbled in—dignified in spite of his haste,—his medicine bag in his hands. This he cast on the ground; an Indian untied it and spread the various little bags in a circle, the sacred bird skull in the center with the turtle shell. And then I witnessed the practice of real Indian medicine as it has been practised from time immemorial among the red men of the plains, and handed down from father to son generation after generation. As soon as he entered the tepee War Bonnet flung himself on his knees before the child and taking its hanging head in his hands uttered a weird cry, half snarl, half grunt, and placing his lips to the child's mouth sucked from its throat mucus which he spat upon the ground. He tore off its clothing; he thumped its chest; he sucked at its throat and chest and the back of its neck, raising great blotches of red flesh dotted full of little pin point specks of blood. A convulsion seized the child still lying across its father's knees, and intoning a chant of most musical rhythm the medicine man dabbed powder on its breast and abdomen and poured cold water over the child from head to foot.

"He'll kill the child," I said to the interpreter.

"If he dies War Bonnet will wake him up again," said the Indian simply. To the Indian mind everything is "him."

"Send her to the hospital," I pleaded.

"No, he will die there," was the reply, final and decisive.

Powders and ointments were rubbed on the child's body; her teeth were tightly clenched and a spoon was used to pry open the jaws. Chewing up a mouthful of what appeared to be dried leaves over which he had sprinkled one of his powders, War Bonnet blew the mass into the child's throat. Strange signs were made on the baby's chest with the bird skull dipped into a paste and then began the heating of the hands over the coals and the mixing of powders and grease, the rubbing, the chanting, the sucking at the throat, the blowing on the closed eyelids, and all the time the child lay dying across the lap of her father whose face, as expressionless as a piece of stone, showed no sign of sorrow or concern. One could not help marvel at the apparent disregard. In the end the child died and I sat on one side of the tepee with War Bonnet and witnessed the most impressive ceremony I have ever seen.

With its last fluttering breath the child's body slumped down into the hollow of its father's lap. Its mother had not returned and a half dozen squaws stood by silent and motionless, waiting for the end. As soon as it was apparent that death had entered the tepee Pretty Boy looked up and thanked War Bonnet for

what he had done. This is never overlooked by an Indian; he is appreciative and in this respect he is the superior of his civilized white brothers. After expressing his gratitude to the medicine man Pretty Boy let his hair down and wept, hugging his dead child close to his breast and talking to it in the Sioux language, crooning and caressing. Sobs shook him and great tears splashed down on the little bronze body. Everyone of the squaws rushed out into the camp and crying out that Mary Pretty Boy was dead, rounded up their own children and sent them skurrying to their tepees for an evil spirit was about. Then they all returned to Pretty Boy's tepee and throwing their blankets over their heads began to mourn. They howled and chanted and teetered up and down on their toes and wept in the death dance of the squaws. They kept this up for a hour or more until a lone, forlorn squaw crawled into the tepee like a whipped dog, her face sorrow-drawn and tear-stained: and creeping, creeping, creeping she came to the sorrow-stricken Indian sitting there with his dead baby in his arms, and kissed her lost child. The squaws left one by one, followed by War Bonnet and his "white brother," and save for the sobbing cries of the mother returned to her desolate home, there was silence in the camp. I wondered how the medicine man would explain his failure to save the child and learned that he fell back on the all-powerful evil spirit, and that his reputation suffered not at all.

I had passed over as unworthy of investigation or even consideration, the stories I had heard of the miracle of raising the dead by medicine men and in fact had forgotten all about it, until one day I found myself suddenly famous among the Indians as a wonder worker fit to rank with the best of their medicine men. The squaw of Blue Horse tumbled over in a faint one afternoon and she was carried into her tepee. The Indians said she was dead. I applied restoratives and in a little while she was all right. Now Blue Horse is a big civil chief in the Sioux Nation and his wife is of some consequence in Sioux society. So when the Indians saw her come back to life after apparent death they gave me credit for having worked a miracle. Blue Horse himself believed it and circulated the story. This simple event explained to me the "marvelous resurrections" by medicine men.

One of the most important branches of civilized medicine is obstetrics; yet the Indians absolutely ignore labor cases. The squaws give birth to children as a matter of course. With them it is survival of the fittest. If everything is normal and there are no complications, the child is born and the mother immediately goes on with her work. She may lie about for a few hours. If there are complications the whole matter is treated

philosophically. The mother dies and with her the child in the majority of cases, and it is Indian fate. This has been the practice for years and years and it may account for the ease with which Indian women bear children.

Nature weeds out those women who cannot give birth to offspring and science has no hand in the matter, except the tribe is camped near an army post and the army surgeon happens to hear of a difficult labor. And so far as I have been able to learn, only the primiparas are given assistance by the women of a tribe. Army surgeons have told me that it is a common practice for pregnant squaws, when the tribe is moving, to drop back when labor pains begin, go to the nearest water, give birth to the child, wash it in the creek or spring beside which she is squatted, jump into the water herself, and follow on after the tribe with the newborn strapped on her back.

There were two labor cases in the Indian camp at the Pan-American, one a Sioux, the other a Navajo. The latter squatted over a blanket, pulling a rope suspended from the ridge pole of the tent, a sister Navajo leaning over her from behind and making downward pressure on the distended abdomen. The labor was simple and uncomplicated and the next morning the mother cooked breakfast for the family. The Sioux woman's baby was four days old before anyone outside of the tribe knew there was a little red stranger in the camp. The child was born at five o'clock in the morning and the mother was out at six o'clock hauling wood and building a fire.

In spite of his exalted position in the tribe an Indian medicine man is only human, and in some California tribes he very often separates his patient from some choice ornament or a sum of money by the performance of sleight-of-hand in effecting a cure of a malady.

Mr. George Wharton James, with whom I talked many times concerning the practices of Indian medicine men, told me several amusing incidents which came under his own notice in his years of association with the different tribes in the West. The Ting-ai-vash, or medicine man of the Cahuillas of Southern California, had a patient with a most troublesome cough which his herbs did not cure. He told the patient that he had a feather growing in his throat which made him cough, and he pretended to pull it from the man's mouth. Of course, it was sleight-of-hand and nothing else. So, too, was his remarkable cure of a case of rheumatism which was said to be due to the presence of a lizard in the man's belly. The Ting-ai-vash took a lizard into his mouth and sucked at the skin of the man's abdomen. Then he spat the lizard on the ground and told the man he was cured.

This old fakir was a most accomplished sort of a man and nothing phased him. One other case was that of a man with a swollen abdomen. The medicine man chanted a song and danced about the patient five or ten minutes and then into the song he put the words to this effect: "Yes, my brother, your belly is big and you are suffering; it is a rope which has been put into you by the magic of a bad Wallapai; I will cure you, my brother, for $5 and take the rope from you and you can keep it; it is the rope, my brother, the rope." He got the $5 and the patient got a piece of rope.

It must not be inferred from this that all Indian medicine men depend on sleight-of-hand tricks or fakes. They all more or less play upon the credulity of their patients. Even old War Bonnet, I doubt not, has squirmed out of some tight places by bringing on the evil spirits which are so dreaded by the Indians. But the real medicine man, the typical product of the plains of the West, such, for instance, as War Bonnet himself, spends years in study and preparation; and in gathering his herbs and roots and fossils he subjects himself to privation and suffering and solitude. When his medicine bag needs replenishing, the medicine man strips himself and naked goes forth into the foot hills and mountains. For seven days he neither eats nor drinks nor sleeps. Back and forth he wanders praying to the Great Spirit and searching for what he is in need of. When he returns to his tribe he is a sorry spectacle, gaunt, hollow-eyed and dirty; yet he has his herbs and roots and his bones and they are doubly efficacious because of the long fasting and the unending prayers.

Whatever we may say of Indian medicine as practised by the medicine man, it has one virtue, even if it does not always cure; it is honest. The medicine man believes in his own drugs and his greatest virtue is that he does not believe in absent treatment. He recognizes that disease is a fact and not a belief; he does not confine his practice to massaging and call himself the Indian equivalent of an osteopath, and although like the Christian scientist he prays over his patient, he is advanced enough to give him medicine.

Indian medicine is interesting to the casual observer; it is fascinating to the favored ones who may be so fortunate as to be permitted to witness its practice. Realising this, recent events in the politics of fake medicine have caused me to wonder what sort of an enabling act would now be before the legislature of this state, if the High Priest of the Amen Corner had fallen into the hands of old War Bonnet, instead of under the beneficent leg-pulling influences of a fair disciple of the diploma mill at Kirkville, Mo.

## IN MEMORIAM

J. H. HOBART BURGE, Permanent Member.
Died at Brooklyn, March 24, 1901, æt. 78.

TABOR B. REYNOLDS, Permanent Member.
Died at Saratoga Springs, July 4, 1901, æt. 80.

JAMES V. KENDALL, Permanent Member.
Died at Baldwinsville, August 5, 1901, æt. 83.

WILLIAM PLATT McLAURY, Permanent Member.
Died at Catskill, August 30, 1901, æt. 55.

J. MORTIMER CRAWE, Permanent Member.
Died at Watertown, October 29, 1901, æt. 71.

JARVIS S. WIGHT, Permanent Member.
Died at Brooklyn, November 17, 1901, æt. 60.

PETER FALING, Permanent Member.
Died at Gasport, November 23, 1901, æt. 62.

PETER R. FURBECK, Permanent Member.
Died at Gloversville, January 17, 1902, æt. 67.

# MEDICAL SOCIETY OF THE STATE OF NEW YORK.

OFFICERS OF THE SOCIETY FROM ITS ORGANIZATION TO THE PRESENT TIME.

| *Year.* | *President.* | *Vice-President.* | *Secretary.* | *Treasurer.* |
|---|---|---|---|---|
| 1807 | Wm. McClelland, | Alexander Shelden, | John Stearns, | Moses Willard. |
| 1808 | Nicholas Romayne, | Alexander Shelden, | John Stearns, | James G. Graham. |
| 1809 | Nicholas Romayne, | Alexander Shelden, | John Stearns, | Andrew Proudfit. |
| 1810 | Nicholas Romayne, | Alexander Shelden, | John Stearns, | Andrew Proudfit. |
| 1811 | William Wilson, | Westel Willoughby, | Benj. R. Bevier, | Asa B. Sizer. |
| 1812 | John R. B. Rodgers, | Westel Willoughby, | John Stearns, | Asa B. Sizer. |
| 1813 | John R. B. Rodgers, | Joseph White, | John Stearns, | James L. Van Kleeck. |
| 1814 | John R. B. Rodgers, | Joseph White, | Ely Burritt, | James L. Van Kleeck |
| 1815 | Joseph White, | Ely Burritt, | James Low, | Westel Willoughby. |
| 1816 | Joseph White, | Ely Burritt, | James Low, | John Stearns. |
| 1817 | John Stearns, | Henry Mitchell, | James Low, | Chas. D. Townsend. |
| 1818 | John Stearns, | Henry Mitchell, | Peter Wendell, | Chas. D. Townsend. |
| 1819 | John Stearns, | Westel Willoughby, | Chas. D. Townsend, | John Downs. |
| 1820 | John Stearns, | Westel Willoughby, | Chas. D. Townsend, | John Downs. |
| 1821 | Samuel L. Mitchell, | Peter C. Adams, | Chas. D. Townsend, | John Downs. |
| 1822 | Samuel L. Mitchell, | Thomas Fuller, | Chas. D. Townsend, | T. Romeyn Beck. |
| 1823 | Alexander Coventry, | John H. Steele, | Chas. D. Townsend, | Jonathan Eights. |
| 1824 | Alexander Coventry, | John H. Steele, | Chas. D. Townsend, | Jonathan Eights. |
| 1825 | James R. Manley, | T. Romeyn Beck, | Platt Williams, | Jonathan Eights. |
| 1826 | James R. Manley, | T. Romeyn Beck, | Platt Williams, | Jonathan Eights. |
| 1827 | T. Romeyn Beck, | Laurens Hull, | Platt Williams, | Jonathan Eights. |
| 1828 | T. Romeyn Beck, | Laurens Hull, | Platt Williams, | Jonathan Eights. |
| 1829 | T. Romeyn Beck, | Henry Mitchell, | Joel A. Wing, | Jonathan Eights. |
| 1830 | Jonathan Eights, | Henry Mitchell, | Joel A. Wing, | Platt Williams. |
| 1831 | Jonathan Eights, | Thomas Spencer, | Joel A. Wing, | Platt Williams. |
| 1832 | Thomas Spencer, | James McNaughton, | Joel A. Wing, | Platt Williams. |
| 1833 | Thomas Spencer, | James McNaughton, | Joel A. Wing, | Platt Williams. |
| 1834 | John H. Steele, | James McNaughton, | Joel A. Wing, | Platt Williams. |
| 1835 | John H. Steele, | James McNaughton, | Joel A. Wing, | Platt Williams. |
| 1836 | James McNaughton, | Samuel White, | Joel A. Wing, | Platt Williams. |
| 1837 | James McNaughton, | Samuel White, | Peter Van O'Linda, | Platt Williams. |
| 1838 | Laurens Hull, | Sumner Ely, | Peter Van O'Linda, | Platt Williams. |
| 1839 | Laurens Hull, | Sumner Ely, | Peter Van O'Linda, | Platt Williams. |
| 1840 | Sumner Ely, | John B. Beck, | Peter Van O'Linda, | Platt Williams. |
| 1841 | John B. Beck, | William Taylor, | Peter Van O'Linda, | Platt Williams. |
| 1842 | William Taylor, | Joel A. Wing, | Peter Van O'Linda, | Platt Williams. |
| 1843 | Samuel White, | Joel A. Wing, | Peter Van O'Linda, | Platt Williams. |
| 1844 | Joel A. Wing, | Harman Van Dusen, | Peter Van O'Linda, | Platt Williams. |
| 1845 | James Webster, | Robert G. Frary, | Peter Van Buren, | Peter Van O'Linda |
| 1846 | John McCall, | Stephen Hasbrouck, | Peter Van Buren, | Peter Van O'Linda. |
| 1847 | Thos. W. Blatchford, | Alex. Thompson, | Peter Van Buren, | Peter Van O'Linda. |
| 1848 | Alex. H. Stephens, | Alex. Thompson, | Peter Van Buren, | Peter Van O'Linda. |
| 1849 | Alex. H. Stephens, | Alex. Thompson, | Peter Van Buren, | Peter Van O'Linda. |
| 1850 | Alex. Thompson, | Jenks S. Sprague, | Thomas Hun, | Peter Van O'Linda. |
| 1851 | Robert G. Frary, | Jenks S. Sprague, | Thomas Hun, | Peter Van O'Linda. |

| Year. | President. | Vice-President. | Secretary. | Treasurer. |
|---|---|---|---|---|
| 1852 | Alonzo Clark, | Jenks S. Sprague, | Thomas Hun, | Peter Van O'Linda. |
| 1853 | Jenks S. Sprague, | Peter Van Buren, | James H. Armsby, | Peter Van O'Linda. |
| 1854 | Charles R. Coventry, | Peter Van Buren, | Howard Townsend, | Peter Van O'Linda. |
| 1855 | Frank H. Hamilton, | Thomas Hun, | Howard Townsend, | Peter Van O'Linda |
| 1856 | Alden March, | Chas. S. Goodrich, | Howard Townsend, | J. V. P. Quackenbush. |
| 1857 | Augustus Willard, | Thos. C. Brinsmade, | Sylves. D. Willard, | J. V. P. Quackenbush. |
| 1858 | T. C. Brinsmade, | George W. Bradford, | Sylves. D. Willard, | J. V. P. Quackenbush. |
| 1859 | B. Fordyce Barker, | Daniel T. Jones, | Sylves. D. Willard, | J. V. P. Quackenbush. |
| 1860 | Daniel T. Jones, | Edward H. Parker, | Sylves. D. Willard, | J. V. P. Quackenbush. |
| 1861 | Edward H. Parker, | Andrew Van Dyck, | Sylves. D. Willard, | J. V. P. Quackenbush |
| 1862 | Thomas Hun, | Daniel P. Bissell, | Sylves. D. Willard, | J. V. P. Quackenbush. |
| 1863 | Daniel P. Bissell, | Joel Foster, | Sylves. D. Willard, | J. V. P. Quackenbush. |
| 1864 | Frederick Hyde, | George J. Fisher, | Sylves. D. Willard, | J. V. P. Quackenbush. |
| 1865 | Henry W. Dean, | Jos. C. Hutchison, | William H. Bailey, | J. V. P. Quackenbush. |
| 1866 | Joseph C. Hutchison, | Julian T. Williams, | William H. Bailey, | J. V. P. Quackenbush. |
| 1867 | John P. Gray, | Lake I. Teft, | William H. Bailey, | J. V. P. Quackenbush. |
| 1868 | J. V. P. Quackenbush, | James P. White, | William H. Bailey, | John V. Lansing |
| 1869 | James P. White, | George Burr, | William H. Bailey, | John V. Lansing |
| 1870 | S. O. Vander Poel, | Gilson A. Dayton, | William H. Bailey, | John V. Lansing. |
| 1871 | William C. Wey, | Andrew F. Doolittle, | William H. Bailey, | Charles H. Porter. |
| 1872 | Cornelius R. Agnew, | B. F. Sherman, | William H. Bailey, | Charles H Porter. |
| 1873 | Edward M. Moore, | Francis Burdick, | William H. Bailey, | Charles H. Porter. |
| 1874 | George J. Fisher, | Harvey Jewett, | William H. Bailey, | Charles H. Porter |
| 1875 | Thos. F. Rochester, | Ellsworth Eliot, | Edward R. Hun, | Charles H. Porter. |
| 1876 | E R Squibb, | J. V. Kendall, | Edward R. Hun, | Charles H. Porter. |
| 1877 | J. Foster Jenkins, | A. L. Saunders, | W. Manlius Smith, | Charles H. Porter. |
| 1878 | D. B. St. John Roosa, | Judson C. Nelson, | W. Manlius Smith, | Charles H. Porter. |
| 1879 | Henry D. Didama, | Nath. C. Husted, | W. Manlius Smith, | Charles H. Porter. |
| 1880 | William H. Bailey, | Abraham Jacobi, | W. Manlius Smith, | Charles H. Porter |
| 1881 | Abraham Jacobi, | William Govan, | W Manlius Smith, | Charles H. Porter. |
| 1882 | Harvey Jewett, | E. D. Ferguson, | W. Manlius Smith, | Charles H. Porter |
| 1883 | Alexander Hutchins, | H. G. P. Spencer, | W. Manlius Smith, | Charles H. Porter. |
| 1884 | B. F. Sherman, | P. R. H. Sawyer, | W Manlius Smith, | Charles H. Porter. |
| 1885 | A. Vander Veer, | Alfred C. Post, | W. Manlius Smith, | Charles H. Porter. |
| 1886 | William S. Ely, | Sol. Van Etten, | W. Manlius Smith, | Charles H. Porter. |
| 1887 | Alfred L. Loomis, | A. M. Phelps, | W. Manlius Smith, | Charles H. Porter. |
| 1888 | Samuel B. Ward, | A. Walter Suiter, | W. Manlius Smith, | Charles H. Porter. |
| 1889 | Daniel Lewis, | Alfred Mercer, | Frederic C. Curtis, | Charles H. Porter. |
| 1890 | W. W. Potter, | L. S. Pilcher, | Frederic C. Curtis, | Charles H Porter. |
| 1891 | A. Walter Suiter, | W. W. Crandall, | Frederic C. Curtis, | Charles H. Porter. |
| 1892 | Lewis S. Pilcher, | Henry L. Elsner, | Frederic C. Curtis, | Charles H. Porter. |
| 1893 | Herman Bendell, | C. L. Stiles, | Frederic C. Curtis, | Charles H. Porter. |
| 1894 | George Henry Fox, | Frank S. Low, | Frederic C. Curtis, | Charles H. Porter. |
| 1895 | Roswell Park, | William Maddren, | Frederic C. Curtis, | Charles H. Porter. |
| 1896 | James D. Spencer, | L. Duncan Bulkley, | Frederic C. Curtis, | Charles H. Porter. |
| 1897 | Seneca D. Powell, | Lucien Howe, | Frederic C. Curtis, | Charles H. Porter. |
| 1898 | John O. Roe, | E. F. Brush, | Frederic C. Curtis, | Charles H. Porter. |
| 1899 | Willis G. Macdonald, | John Gerin, | Frederic C. Curtis, | Charles H Porter. |
| 1900 | A. M. Phelps, | George Seymour, | Frederic C. Curtis, | O. D. Ball. |
| 1901 | Henry L. Elsner, | Louis N. Lanehart, | Frederic C. Curtis, | O. D. Ball. |
| 1902 | Henry R. Hopkins, | William A. Moore, | Frederic C. Curtis, | O. D. Ball. |

# OFFICERS, 1902

PRESIDENT,
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WILLIAM A. MOORE, Binghamton.

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FREDERIC C. CURTIS, Albany.

TREASURER,
O. D. BALL, Albany.

## MEMBERS

### I. Delegates from County Medical Societies, etc.
(By-laws, Chapter I.)

*Albany County:*
Robert Babcock, Albany.
E. A. Bartlett, "
George Blumer, "
T. L. Carroll, "
A. W. Elting, "
W. H. Happel, "
C. H. Moore, "
G. H. Munson, "
W. H. Murray, "
L. H. Neuman, "
Thomas A. Ryan, "
W. B. Sabin, "
Arthur Sautter, "
H. L. K. Shaw, "
Clement F. Theisen, "
E. A. Vander Veer, "
J. L. Archambault, Cohoes.
J. H. Mitchell, "
Daniel C. Case, Slingerlands.

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W. H. Loughead, Nile.
George W. Roos, Wellsville.

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William E. Ard, Binghamton.
Richard R. Daly, "
Edward F. Day, "
J. Killen, "
Frederick W. Miller, "
W. S. Overton, "
Frank W. Sears, "
Edward L. Smith, "
Charles R. Seymour, "

*Cattaraugus County:*
F. C. Beals, Salamanca.
Guy B. Crandall, Randolph.
M. C. Hawley, East Randolph.
W. B. Johnston, Ellicottville.
A. D. Lake, Gowanda.
J. E. K. Morris, Olean.
Cassar Smith, "
James A. Taggert, Salamanca.
Edward Torrey, Allegany.
W. H. Vincent, Hinsdale.

*Cayuga County:*
B. I. C. Buckland, Fleming.
A. L. Hall, Fairhaven.
Frederick Sefton, Auburn.
Sheldon Voorhees, "
M. B. Van Buskirk, "

*Chautauqua County:*
C. E. Ellis, Sherman.
E. S. Rich, Kennedy.

*Chemung County:*
A. H. Baker, Elmira.
Arthur W. Booth, "
La Rue Colegrove, Wellsburg.
J. W. Gee, Van Etten.
Anna M. Stuart, Elmira.

*Chenango County:*
Vincent Burgess, Brisbin.
Robert H. Phelps, Norwich.
E. L. Gaus, Oxford.
Homer E. Smith, Norwich.

*Clinton County:*
M. D. Briggs, Champlain.
Robert B. Lamb, Dannemora.
Cassius D. Silver, Plattsburgh.
T. A. Rogers, "
James M. Hackett, Champlain

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Henry W. Johnson, Hudson.
Martin M. Kittell, Kinderhook.
Emmett Niver, Hillsdale.
C. G. Rossman, Hudson.

*Cortland County:*
H. S. Braman, Homer.
H. C. Hendrick, McGrawville.
Benjamin Kinyon, Cincinnatus.
Frank D. Reese, Cortland.
M. R. Smith, McGraw.

*Delaware County:*
S. E. Churchill, Stamford.
Gilbert T. Scott, Davenport.
Stanton Hendrick, Treadwell.

*Dutchess County:*
T. E. Bamford, Poughkeepsie.
Nelson Borst, "
E. M. Burns, "
J. H. Cotter, "
I. G. Harris, "
L. C. Wood, "
Charles W. Pilgrim, "
John H. Doughty, Matteawan.
I. M. Cornell, Wappinger Falls,
G. H. Van Wagner, "

*Erie County*:*
Justin G. Thompson, Angola.
John D. McPherson, Akron.
Walter D. Greene, 385 Jersey st
Henry D. Ingraham, 405 Franklin st
I. M. Snow, 476 Franklin st
Wm. G. Bissell, 143 Elmwood av
A. L. Benedict, 998 Main st
N. W. Wilson, 153 Seventh st
Wm. C. Phelps, 146 Allan st
Edward H. Ballou, Gardenville
R. S. Meyers, Clarence Centre
F. E. Fronezak, 508 Fillmore av
Julius Ullman, 400 Franklin st
John H. Grant, 891 Ellicott sq
Wm. F. May, 658 Clinton st
C. E. Congdon, 1034 Jefferson st
Dewitt H. Sherman, 666 Main st
C. P. Smith, 90 N. Pearl st
G. R. Trowbridge, 1331 Main st
Geo. F. Cott, 16 Woodlawn av
F. E. L. Brecht, 361 William st
Jas. J. Mooney, 393 Seventh st
Joseph Fowler, 141 Delaware av
Chas. A. Wall, 306 Hudson av.
J. Pohlman, 404 Franklin st
Benjamin G. Long, 520 Elmwood
Walden M. Ward, North Collins
J. H. Dowd, 378 Franklin st
J. B. Coakley, 339 Delaware av
Henry R. Lapp, Clarence
A. E. Woehnert, 155 Allen st
W. D. Bidaman, 330 Connecticut av
John J. Twohey, 301 Masten av
C. A. Clements, 916 Niagara av
E. M. Dooley, 406 Louisiana av
B. S. Bourne, Hamburg
W. G. Taylor, 822 Elmwood av

*Essex County:*

*Franklin County:*
C. A. Hastings, Constable

*Fulton County:*
William C. Wood, Gloversville
Charles B. Mosher, Johnstown
James K. Young, "
Nelson Everest, Gloversville
Frederick I. Jansen, Fonda

*Genesee County:*

*Greene County:*
Ambrose Beach, Coxsackie
A. W. Van Slyke, "
L. B. Honeyford, Cairo
E. C. Van Dusen, Athens
W. A. Wasson, Greenville

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D. M. Devendorf, Herkimer
George S. Eveleth, Little Falls
Seymour S. Richards, Frankfort
U. G. Williams, Newport
William E. Hayes, Frankfort

*Jefferson County:*
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C. B. Forsythe, Alexandria Bay
Gilbert Connor, Watertown
James F. McCaw "
Chas. N. Bibbins, "
Gilbert D. Gregor, "
Fred'k B. Smith, "
Elmer E. Eddy, Redwood
Geo. E. Sylvester, Black River
H. C. Potter, Morrisville

*Kings County:*
Victor L. Zimmerman
James A. Somers
Lefferts A. McClelland
Wm. A. Jewett
Wm. L. Chapman
Lewis N. Foote
Geo. F. Little
A. M. Judd
Chas. G. Molin
Malcolm E. Parrott
Ralph Tousey
J. B. Pendelton
C. H. Tag
John Horni
Wm. A. Northridge
R. M. Elliott
Wm. P. Pool

* Where no town is mentioned Buffalo is to be understood.

Wm. H. Sheppard
Francis S. Kennedy
Chas. R. Jenkins
Ruppert S. Royce
Stewart Lewis
Stephen H. Lutz
C. F. Yerdon
George Everson
Adam Schauf
E. M. Bullwinkle
Henry F. Adams
A. S. Ambler
W. S. Applegate
Benj. Ayers
F. R. Baker
L. G. Baldwin
Homer L. Bartlett
H. B. Bayles
C. D. Beasley
Frances P. Beebe
Nathan T. Beers, Jr.
Wm. N. Belcher
H. Bender
W. H. Biggam
B. G. Blackmar
A. H. Bogart
J. B. Bogart
R. C. Brewster
Carroll Chase
G. W. Colby
T. C. Craig
W. J. Cruikshank
H. P. De Forest
Geo. Drury
Benj. Edson
Geo. Essig
G. N. Ferris
J. W. Fleming
R. S. Fowler
W. M. Friend
J. F. Golding
Chas. H. Goodrich
W. H. Haynes
J. C. Hancock
H. N. Hoople
J. W. Ingals
Wm. S. Hubbard
P. C. Jameson
Oswald Joerg
Florence Jones
J. A. Kene
C. Le G. Kerr
C. D. Kevin
L. C. McPhial
H. R. Maine
Arch. Murray
C. D. Napier
E. L. Oatman
B. Onuf
F. C. Paffard
Ernest Palmer
Willard G. Reynolds
C. T. Sauer
F. H. Shaw
J. D. Shay

*Lewis County:*
S. H. Murphy, Despatch
P. H. von Zierolshofen, Croghan
F. E. Jones, Beaver Falls
F. A. Crane, Lowville
W. O. Hubbard, Lowville

*Livingston County:*
Edward A. Sharp, Sonyea
Annie M. Tremaine, "
F. J. Bowen, Mt. Morris
F. B. Dodge, "
John P. Brown, Nunda

*Madison County:*
James F. Huntley, Oneida
Charles H. Perry, "
C. M. Colegrove, Canastota
O. S. Langworthy, Hamilton

*Monroe County:*
Frederick D. Andrew, Rochester
W. D. Becker, "
W. M. Brown, "
R. L. Carson, "
Robert G. Cook, "
C. E. Darrow, "
Simon L. Elsner, "
Wm. V. Ewers, "
W. S. Hall, "
I. E. Harris, "
Loren W. Howk, "
C. A. Huber, "
Irving E. Harris, "
D. G. Hastings, "
Owen E. Jones, "
Frank A. Jones, "
C. T. La Moure, "
J. L. Roesboom, "
Nathan W. Soble, "
Benjamin Wilson, "
W. D. Wolf, "
John Zimmer, "
W. J. Howe, Scottsville

*Montgomery County:*
W. J. Peddie, Fultonville
Otis Z. Bouton, "
George L. Meyer, Stone Arabia
James B. Conant, Amsterdam
Fred'k I. Jansen, Fonda

*New York County:*
I. N. Love, 537 Fifth av
S. Alexander, 5 West 58th st
John Aspell, 105 Madison av
R. Bellamy, 210 West 57th st
W. Coleman, 5 West 30th st
R. S. Adams, 6 East 34th st
C. C. Barrows, 8 West 36th st
L. A. Conner, 53 East 49th st
C. W. Cutler, 36 East 33rd st
Geo. S. Dixon, 124 Lexington av

M. J. Echeverria, 141 West 73rd st
F. S. Fielder, 33 West 93rd st
F. W. Gwyer, 130 East 38th st
Wm. T. Gibb, 55 West 38th st
Geo. D. Hamlen, 8 West 36th st
J. A. Hartwell, 50 West 53rd st
J. C. Johnston, 64 East 56th st
A. B. Johnson, 12 East 58th st
W. M. Polk, 7 East 36th st
O. H. Schultze, 1109 Madison av
G. Seeligman, 53 East 72nd st
Wm. Shannon, 117 West 81st st
E. P. Shelby, 30 West 32d st
Wm. F. Stone, 129 West 43rd st
Ben. T. Tilton, 59 West 36th st
Geo. Woolsey, 117 East 36th st
Wm. S. Stone, 1730 Broadway
R. T. Bang, 139 West 11th st
Reuben F. Monette, Manhattan State Hospital
Frank H. Magness, Manhattan State Hospital
Herman C. Evarts, Manhattan State Hospital
William K. Otis, 5 West 50th st
E. K. Dunham, 338 East 26th st
E. Le Fevre, 52 West 56th st
John H. Huddleston, 126 West 85th st
S. A. Brown, 11 West 45th st
Francis A. Scratchley, 154 East 72nd st
J. F. Erdman, 60 West 52nd st
C. G. Coakley, 11 West 45th st
H. M. Silver, 5 East 43rd st
J. E. Weeks, 136 West 16th st
C. H. Lewis, 47 West 58th st
E. H. Griffen, 112 West 45th st
B. Symonds, 410 West 20th st
R. C. James, 5 West 30th st
W. J. Pulley, 945 Madison av
S. Oppenheimer, 706 Madison av
Perry S. Boynton, 103 West 84th st
Henry F. Quackenboss, 159 West 88th st
Leon LeWald, 436 Lexington av
M. Nicoll, Jr., 168 West 48th st
G. R. Satterlee, 252 Madison av
John B. Huber, 41 West 45th st
A. W. Ferris, 343 Madison av
H. L. Reis, 219 East 12th st
J. K. Alvarez, 1159 Park av
Edward W. Peet, 348 Central Park West
Wm. B. Noyes, 28 West 61st st
Ludwig Weiss, 77 East 94th st
C. E. Lambert, 135 West 104th st
Henry Roth, 66 East 135th st
H. Koplik, 66 East 58th st
James H. Voorhees, 126 West 58th st
A. S. Vosburgh, 40 West 88th st
H. E. Hale, 77 West 50th st
L. W. Hotchkiss, 24 East 54th st
F. C. Wood, 205 West 57th st
H. A. Griffen, 346 Broadway
W. S. Bickham, 922 Madison av
David Bovaird, Jr., 126 West 58th st
E. L. Dow, 49 West 57th st
V. H. Norrie, 21 West 37th st
C. Wallace, 165 West 80th st
W. H. Caswell, 201 West 55th st
S. E. Jelliffe, 231 West 71st st
F. R. Oastler, 115 East 56th st
Charles H. May, 692 Madison av
W. K. Simpson, 952 Lexington av
Francis Huber, 209 East 17th st
Pearce Bailey, 4 West 50th st
Fred'k Peterson, 4 West 50th st
C. A. Whiting, 70 West 47th st
C. H. Peck, 37 West 48th st
T. H. Manley, 115 West 49th st
S. Tousey, 103 West 76th st
H. Cheesman, 171 West 91st st
F. J. C. Fitzgerald, 624 Lexington av
J. Milton Mabbott, 19 Fifth av
R. W. Eastman, 140 West 76th st
Wm. O. Moore, 42 East 29th st
W. H. Porter, 210 West 57th st
J. R. Nilson, 69 West 50th st
G. M. Hammond, 58 West 45th st
H. D. Chapin, 51 West 51st st
Leonard Weber, 25 West 46th st
Max Einhorn, 20 East 63rd st
H. B. Douglas, 121 East 36th st
S. G. Gant, 58 West 56th st
C. W. Allen, 30 East 33rd st
Franz Torek, 59 East 60th st
W. S. Bainbridge, 34 Gramercy Park
T. G. Lusk, 121 East 40th st
J. N. West, 71 West 49th st
S. S. Graber, 185 East 71st st
F. C. Combes, 165 East 116th st
J. S. Emans, 221 East 19th st
A. Rose, 126 East 29th st
J. B. Ferguson, 123 East 19th st
C. A. McWilliams, 50 East 53rd st
C. R. L. Putman, 114 East 38th st
F. N. Irwin, 10 West 39th st
J. J. McGrath, 105 East 73rd st
W. B. Brown, 214 West 44th st
F. N. Wilson, 106 West 47th st
D. H. Weisner, 162 East 46th st
E. F. Smith, 324 West 46th st

Wm. H. Bates, 50 East 64th st
A. W. Hollis, 111 West 47th st
Wm. L. Culbert, 118 Madison av
G. H. Cobb, South Orange, N. J.
E. C. Dent, Manhattan State Hospital
L. A. Rodenstein, 561 West 162nd st
T. J. Harris, 117 East 40th st
C. A. Manson, 123 East 36th st
E. S. Thomson, 16 East 43rd st
John Van Doren Young, 60 West 76th st
W. W. Gilfillan, 24 West 59th st
H. Illoway, 1138 Madison av
C. N. Dowd, 135 West 73rd st
N. H. Henry, 48 West 11th st
E. P. Fowler, 18 East 58th st
A. B. Duel, 254 Madison av
Justin Wohlfarth, 119 West 129th st
Carl Koller, 715 Madison av
J. B. White, 1013 Madison av
R. A. Murray, 112 West 80th st
Alfred Meyer, 801 Madison av
J. B. Squier, 29 East 44th st
Morris Manges, 941 Madison av
F. J. Leviseur, 741 Madison av
M. McLean, 29 East 126th st
W. L. Stowell, 28 West 36th st
J. A. Kenefick, 29 West 36th st
Heinrich Stern, 56 East 76th st
W. P. Brandegee, 17 West 46th st
J. B. Clemens, 19 East 38th st
W. B. Pritchard, 105 West 73rd st
J. B. Rae, 668 East 157th st
S. M. Payne, 542 Fifth av
Wm. A. Macy, Willard, N. Y.
George Meyers, 47 East 61st st
S. A. Knopf, 16 West 95th st
L. Fischer, 65 East 90th st
J. B. Walker, 33 East 33rd st
P. J. McCourt, 233 West 23rd st
C. S. May, 205 West 57th st
J. L. Barnes, 16 East 43rd st
J. Brettauer, 45 East 64th st
W. A. Ewing, 134 West 58th st
J. H. Branth, 183 West 87th st
F. J. Parker, 49 West 50th st
Z. L. Leonard, 19 West 120th st
W. C. McFarland, 360 West 51st st
Frank H. McLaury, 244 West 42nd st
Franklin G. Ketcham, 318 West 84th st.
T. H. Willard, 1 Madison av
S. M. Brickner, 136 West 85th st.
S. F. Hallock, 36 East 65th st
Antonie P. Voilawsky, 72 St. Mark's Place
P. F. Sondern, 19 East 38th st
Frank N. Emmert, 110 West 132nd st
W. G. Le Boutillier, 45 West 50th st
L. W. Zwisohn, 1085 Lexington av
Homer Wakefield, 1048 Fifth av
John T. W. Rowe, Manhattan State Hospital

*Niagara County:*

F. J. Baker, Lockport
C. N. Palmer, "
Walter A. Scott, Niagara Falls

*Oneida County:*

B. P. Allen, Oriskany
Smith Baker, Utica
Thomas J. Bergen, Utica
F. D. Crim, "
Conway A. Frost, Rome
V. B. Hamlin, Clinton
C. R. Hart, New Hartford
E. M. Hyland, Utica
L. H. Jones, "
T. Z. Jones, Waterville
L. F. Pattengill, Utica
Chas. P. Russell, "
D. H. Roberts, "
W. J. Schuyler, "
Thomas P. Scully, Rome

*Onondaga County:*

H. C. Baum, Syracuse
J. H. Burch, Baldwinsville
B. F. Chase, East Syracuse
M. Helen Cullings, Syracuse
William A. Curtin, "
F. E. Easton, "
Hiram B. Hawley, "
A. W. Hedden, "
A. S. Hotaling, "
W. C. Kellogg, "
I. H. Levy, "
B. W. Loomis, "
C. E. McCrary, "
G. M. Price, "
A. B. Randall, "
Charles S. Roberts, "
F. W. Smith, "
W. J. Werfleman, "
I. M. Slingerland, Fayetteville
R. A. Whitney, Liverpool

*Ontario County:*

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*Orange County:*

D. B. Hardenbergh, Middletown
W. I. Purdy, "
H. B. Swartwout, Port Jervis
H. Hardenbergh, "

C. E. Townsend, Newburgh
Wm. Hollinger, "
G. H. Brown, Highland Falls
Theo. Writer, Otisville
Jacob B. Peters, Walden
A. P. Farries, Florida

*Orleans County:*

R. W. Barnbee, Kendall

*Oswego County:*

W. G. Babcock, Cleveland
H. G. Bartlett, Williamstown
Pascal M. Dowd, Oswego
Emory J. Drury, Phœnix
Leroy F. Hollis, Sandy Creek
Charles E. Low, Pulaski
H. P. Marsh, Fulton
George W. Nelson, Orwell
S. A. Russell, Fulton
C. A. Sheridan, Oswego

*Otsego County:*

A. W. Cutler, Oneonta
W. R. Lough, Edmeston
Charles E. Parish, Maryland
Henry D. Sill, Cooperstown
J. W. Swanson, Springfield

*Putnam County:*

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*Queens-Nassau Society:*

J. H. Barry, Long Island City
J. H. Bogart, Roslyn
Wm. T. Burnett, Long Island City
G. Herbert Carter, Huntington
Frank T. DeLano, Rockville Centre
George H. Donahue, Northport
George W. Faller, Oyster Bay
W. G. Frey, Long Island City
Samuel Hendrickson, Jamaica
J. R. Hinkson, Long Island City
J. E. Hutcheson, Rockville Centre
Walter Lindsay, Huntington
George K. Meynen, Jamaica
R. F. Macfarlane, Long Island City
C. M. Niesley, Manhasset
E. H. Pershling, Lawrence
James D. Trask, Astoria
J. F. Valentine, Richmond Hill

*Rensselaer County:*

C. H. Travell, Troy
M. A. Wheeler, "
Hiram Elliott "
Wm. Finder, "
William Kirk, Jr., Troy
Thomas G. Dickson, "
John B. Harvie, "
Thomas G. Wright, "
H. E. DeFreest, Troy
B. S. Booth, "
R. A. Kirkpatrick, "
A. D. Davidow, "
James Love, "

*Richmond County:*

E. D. Wiseley, Port Richmond
William T. Van Vredenburgh, New Brighton
Jefferson Scales, New Brighton
John T. Sprague, Clifton
Wm. Bryan, W. New Brighton

*Rockland County:*

Frank E. Pagett, Spring Valley
S. Demarest, Suffern
E. B. Laird, Haverstraw
J. Sengstacken, Stony Point
Garrett A. Blauvelt, Nyack

*St. Lawrence County:*

W. H. Hanbridge, Ogdensburg
H. A. McIlmoyl, "
James Wiltsie, Benson's Mines
S. E. Brown, Ogdensburg
Grant C. Madill, "
F. F. Drury, "

*Saratoga County:*

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*Schenectady County:*

Alexander Ennis, Pattersonville
Charles F. Clowe, Schenectady
Charles G. Briggs, "
Joseph Raymond, "
Dayton L. Kathan, "

*Schoharie County:*

C. K. Frazier, Cobleskill
H. L. Odell, Sharon Springs
John H. Weckel, Breakabeen
C. S. Best, Middleburgh
O. A. Snyder, Schoharie
LeRoy Becker, Cobleskill

*Schuyler County:*

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*Seneca County:*

James E. Medden, Seneca Falls

*Steuben County:*

Willis S. Cobb, Corning
J. G. Kelly, Hornellsville
John L. Miller, Corning
Thomas H. Pawling, Bath
W. W. Smith, Avoca
C. B. Stephens, Wallace
Stephen M. Switzer, Bradford
James E. Walker, Hornellsville
H. B. Smith, Corning
P. L. Alden, Hammondsport

*Suffolk County:*

P. V. B. Fowler, Centre Moriches

B. F. Many, Port Jefferson
A. M. Payne, Riverhead
W. H. Ross, Brentwood
William B. Savage, East Islip

*Sullivan County:*

*Tioga County:*
George M. Cady, Nichols

*Tompkins County:*
Luzerne Coville, Ithaca

*Ulster County:*
Daniel Connelly, Kingston
W. D. Hasbrouck, Rondout
E. E. Norwood, Kingston
A. S. Vrooman, High Falls
J. J. Wolf, Rondout
J. L. Preston, Kingston
Buel Latcher, High Falls
Rufus Crawford, West Camp
Jacob Chambers, Kingston
H. C. Keator, Rosendale

*Warren County:*

*Washington County:*
George M. Stillman, Argyle
Samuel Pashley, Hartford
W. A. Tenney, Granville
S. B. Irwin, West Hebron
James T. Park, Sandy Hill

*Wayne County:*
J. F. Myers, Sodus

*Westchester County:*
C. W. Buckmaster, Yonkers
C. F. Chapman, Mt. Kisco
E. F. Duffy, Yonkers
Samuel E. Getty, Yonkers
W. F. Greene, Mt. Vernon
Robert T. Howe, Mt. Vernon
J. F. Hunter, Mamaroneck
Lewis P. Knapp, White Plains
C. S. Mead, Portchester
W. N. Miller, Croton-on-Hudson
T. Oscar Myers, Mt. Vernon
D. M. Orleman, Peekskill
W. H. Sherman, Yonkers
A. O. Snowden, Peekskill
P. C. Snowden, "

*Wyoming County:*

*Yates County:*

*New York Academy of Medicine:*
J. H. Huddleston, 126 West 85th st
Egbert Lefevre, 52 West 56th st
Louis Faugeres Bishop, 30 West 36th st
J. A. Booth, 46 West 49th st
James Ewing, 260 West 57th st

*The University and Bellevue Hospital Medical College:*

*College of Physicians and Surgeons, New York:*

*N. Y. Post-Graduate Medical School:*
Edw. S. Peck, 53 West 50th st

*New York Polyclinic:*
R. H. M. Dawbarn, 105 West 74th st

*Long Island College Hospital:*

*Medical Department, Union University:*
John V. Hennessy, Albany

*Medical Department, University of Buffalo:*
John Parmenter, Buffalo

*College of Medicine, Syracuse University:*
A. E. Larkin, Syracuse

*Rochester Pathological Society:*
F. D. Andrew, Rochester

*Medical Assoc. of Northern New York:*
C. D. Silver, Plattsburgh

*Utica Medical Club:*
W. R. Marsden, Utica

*Utica Medical Library Association:*
F. H. Brewer, Utica

*Elmira Academy of Medicine:*
C. G. R. Jennings, Elmira

*Society of Physicians of Canandaigua:*
William B. Clapper, Farmington

*Practitioners' Society of Rochester:*

*Syracuse Academy of Medicine:*
F. H. Flaherty, Syracuse

*Amsterdam Medical Society:*
I. R. Fairbanks, Amsterdam

*Long Island Medical Society:*
L. L. Nichols, Brooklyn

*Medical Association, City of Mt. Vernon and Environs:*
Edward S. Newell, Mount Vernon

*West End Medical Society of New York City:*
Charles G. Kerley, 113 W. 83d st

*Gloversville and Johnstown Medical Society:*
Arthur C. Hagedorn, Gloversville

*The German Medical Society of Brooklyn:*
Joseph Meyer, 228 Vernon av

## II. Permanent Members.

(By-laws; Chapter I, Sec. 7 to 10; Chapter VII, Sec. 1 to 7. Names in *italics* in the following list are of retired permanent members.)

| Year of Election | | | County |
|---|---|---|---|
| 1880 | Herman R. Ainsworth, | Addison, | Steuben |
| 1901 | Henry A. Alderton, | Brooklyn, | Kings |
| 1887 | Charles S. Allen, | Rensselaer, | Rensselaer |
| 1885 | Eli Allison, | Wayne, | Steuben |
| 1900 | Henry E. Allison, | Fishkill Landing, | Dutchess |
| 1892 | Edward B. Angell, | Rochester, | Monroe |
| 1888 | Gorham Bacon, | 47 West 54th st., | New York |
| 1858 | *Charles G. Bacon* (1884), | Fulton, | Oswego |
| 1902 | Charles J. Bacon, | Fulton, | Oswego |
| 1891 | Frederick D. Bailey, | Brooklyn, | Kings |
| 1897 | Eugene Baker, | Ithaca, | Tompkins |
| 1891 | Lewis Balch, | Albany, | Albany |
| 1897 | Frank Baldwin, | Brooklyn, | Kings |
| 1893 | O. D. Ball, | Albany, | Albany |
| 1895 | Eveline P. Ballentine, | Rochester, | Monroe |
| 1889 | L. Bolton Bangs, | 29 East 44th st., | New York |
| 1896 | Silas J. Banker, | Fort Edward, | Washington |
| 1898 | Herbert A. Barney, | Belmont, | Allegany |
| 1896 | David A. Barnum, | Cassville, | Oneida |
| 1902 | Merritt Wright Barnum, | Ossining, | Westchester |
| 1900 | James F. Barker, | Albany, | Albany |
| 1899 | Elias H. Bartley, | Brooklyn, | Kings |
| 1899 | Joshua L. Barton, | 57 East 55th st., | New York |
| 1884 | Milford L. Bates, | Canaan 4 Corners, | Columbia |
| 1876 | Eugene Beach, | Gloversville, | Fulton |
| 1895 | Albert L. Beahan, | Canandaigua, | Ontario |
| 1895 | Frank Beebe, | Johnstown, | Fulton |
| 1866 | *A. N. Bell* (1881), | Brooklyn, | Kings |
| 1887 | Herman Bendell, | Albany, | Albany |
| 1879 | M. L. Bennett, | Watkins, | Schuyler |
| 1885 | John M. Bigelow, | Albany, | Albany |
| 1897 | Chauncey P. Biggs, | Ithaca, | Tompkins |
| 1898 | Gilbert Birdsall, | North Brookfield, | Madison |
| 1896 | Joseph B. Bissell, | 15 West 58th st., | New York |
| 1901 | Louis P. Blair, | McDonough, | Chenango |
| 1896 | Herman J. Boldt, | 39 East 61st st., | New York |
| 1896 | Reed B. Bontecou, | Troy, | Rensselaer |
| 1888 | *C. W. Bourne* (1898), | Hamburgh, | Erie |
| 1888 | James P. Boyd, | Albany, | Albany |
| 1900 | George A. Bradbury, | Troy, | Rensselaer |
| 1901 | W. C. Braislin, | Brooklyn, | Kings |
| 1897 | Charles M. Brasted, | Hornellsville, | Steuben |
| 1874 | Elisha H. Bridges, | Ogdensburg, | St. Lawrence |
| 1902 | George B. Broad, | Syracuse, | Onondaga |
| 1901 | Edmond F. Bronk, | Amsterdam, | Montgomery |
| 1894 | Charles W. M. Brown, | Elmira, | Chemung |
| 1883 | *A. J Browne* (1900), | Utica, | Oneida |
| 1895 | William Browning, | Brooklyn, | Kings |
| 1898 | A. T. Bristow, | Brooklyn, | Kings |

| Year of Election | | | County |
|---|---|---|---|
| 1899 | Arthur C. Brush, | Brooklyn, | Kings |
| 1888 | Edward F. Brush, | Mt. Vernon, | Westchester |
| 1898 | George W. Brush, | Brooklyn, | Kings |
| 1897 | Joseph D. Bryant, | 32 West 48th st., | New York |
| 1868 | *Israel I. Buckbee* (1882), | Fonda, | Montgomery |
| 1887 | L. Duncan Bulkley, | 531 Madison av., | New York |
| 1894 | Ten Eyck O. Burleson, | Bath, | Steuben |
| 1894 | Daniel S. Burr, | Binghamton, | Broome |
| 1889 | Stephen Smith Burt, | 21 West 32nd st., | New York |
| 1898 | William E. Butler, | Brooklyn, | Kings |
| 1894 | Glenworth R. Butler, | Brooklyn, | Kings |
| 1892 | Peter A. Callan, | 35 West 38th st., | New York |
| 1885 | *A. M. Campbell* (1894), | Mt. Vernon, | Westchester |
| 1901 | William Francis Campbell | Brooklyn, | Kings |
| 1897 | Elon N. Carpenter, | 110 West 57th st., | New York |
| 1884 | *H. W. Carpenter* (1895), | Oneida, | Madison |
| 1901 | Thomas B. Carpenter, | Buffalo, | Erie |
| 1884 | *S. S. Cartwright* (1894), | Roxbury, | Delaware |
| 1890 | Charles Carey, | Buffalo, | Erie |
| 1866 | *J. E. Casey* (1890), | Mohawk, | Herkimer |
| 1896 | Walter Franklin Chappell, | 7 East 55th st., | New York |
| 1879 | Walter B. Chase, | Brooklyn, | Kings |
| 1895 | William S. Cheeseman, | Auburn, | Cayuga |
| 1886 | *Charles H. Chubb* (1899), | Palenville, | Greene |
| 1889 | John H. Cipperly, | Troy, | Rensselaer |
| 1895 | Frederick L. Classen, | Albany, | Albany |
| 1902 | J. M. Clayland, | Brooklyn, | Kings |
| 1895 | William T. Clute, | Schenectady, | Schenectady |
| 1894 | Henry C. Coe, | 8 West 76th st., | New York |
| 1896 | Lewis A. Coffin, | 49 West 50th st., | New York |
| 1895 | Carter S. Cole, | 122 West 73rd st., | New York |
| 1891 | Philander Collard, | Sing Sing, | Westchester |
| 1899 | Herman L. Collyer, | 109 East 54th st., | New York |
| 1867 | *Darvin Colvin* (1884), | Clyde, | Wayne |
| 1890 | William J. Conklin, | Fishkill, | Dutchess |
| 1902 | William L. Conklin, | Rochester, | Monroe |
| 1900 | Michael P. Conway, | Auburn, | Cayuga |
| 1888 | Daniel H. Cook, | Albany, | Albany |
| 1896 | James S. Cooley, | Glen Cove, | Queens |
| 1888 | J. Leonard Corning, | 53 West 38th st., | New York |
| 1891 | Charles N. Cox, | Brooklyn, | Kings |
| 1897 | Joseph D. Craig, | Albany, | Albany |
| 1890 | *Herman Craft* (1900), | Stone Ridge, | Ulster |
| 1882 | Joseph P. Creveling, | Auburn, | Cayuga |
| 1891 | Charles W. Crispell, | Rondout, | Ulster |
| 1898 | Montgomery A. Crockett, | Buffalo, | Erie |
| 1899 | James K. Crook, | 783 Madison av., | New York |
| 1895 | William L. Cuddeback, | Port Jervis, | Orange |
| 1890 | Charles M. Culver, | Albany, | Albany |
| 1899 | B. Farquhar Curtis, | 7 East 41st st., | New York |
| 1882 | Frederic C. Curtis, | Albany, | Albany |
| 1896 | Newton F. Curtis, | White Plains, | Westchester |
| 1885 | John G. Curtis, | 327 West 58th st., | New York |
| 1896 | Alexander Dallas, | New York, | New York |

| Year of Election | | | County |
|---|---|---|---|
| 1891 | Charles L. Dana, | 53 West 53rd st., | New York |
| 1896 | Henry T. Dana, | Cortland, | Cortland |
| 1900 | Charles E. Davis, | Albany, | Albany |
| 1899 | Thomas Darlington, | Kingsbridge av., | New York |
| 1902 | A. Edward Davis, | 42 East 41st st., | New York |
| 1902 | Morris J. Davies, | Utica, | Oneida |
| 1896 | Spencer L. Dawes, | Albany, | Albany |
| 1891 | Henry H. Deane, | Watertown, | Jefferson |
| 1899 | Cornelius W. De Baun, | Fonda, | Montgomery |
| 1893 | William B. De Garmo, | 56 West 36th st., | New York |
| 1889 | Francis Delafield, | 12 West 32d st., | New York |
| 1894 | H. Beekman Delatour, | Brooklyn, | Kings |
| 1902 | Edward Bradford Dench, | 17 West 46th st., | New York |
| 1888 | Charles A. Dewey, | Rochester, | Monroe |
| 1901 | Orson G. Dibble, | Pompey, | Onondaga |
| 1901 | Percival F. Dolphin, | Malone, | Franklin |
| 1898 | Charles E. Doubleday, | Penn Yan, | Yates |
| 1892 | Charles E. Douglass, | Lowville, | Lewis |
| 1890 | *O. B. Douglas* (1901), | 123 East 36th st., | New York |
| 1899 | Henry S. Drayton, | 70 Fifth av., | New York |
| 1878 | *H. G. Du Bois* (1900), | Camden, | Oneida |
| 1897 | A. Palmer Dudley, | 678 Madison av., | New York |
| 1900 | Thomas A. Dundas, | Elmira, | Chemung |
| 1896 | Theodore Dunham, | 307 West 76th st., | New York |
| 1896 | Henry Strong Durand, | Rochester, | Monroe |
| 1898 | Jesse T. Duryea, | Brooklyn, | Kings |
| 1896 | Daniel C. Dye, | Utica, | Oneida |
| 1900 | Orlando C. Eastman, | Watertown, | Jefferson |
| 1886 | Joseph W. Eddy, | Oswego, | Oswego |
| 1900 | R. Jerome Eddy, | Glens Falls, | Warren |
| 1895 | George M. Edebohls, | 59 West 49th st., | New York |
| 1893 | John Edwards, | Gloversville, | Fulton |
| 1870 | *Ellsworth Elliot* (1887), | 48 West 36th st., | New York |
| 1896 | Elmore E. Elliott, | Catskill, | Greene |
| 1892 | Henry L. Elsner, | Syracuse, | Onondaga |
| 1875 | William S. Ely, | Rochester, | Monroe |
| 1892 | Z. Taylor Emery, | Brooklyn, | Kings |
| 1902 | Bache McEvers Emmet, | 18 East 30th st., | New York |
| 1871 | Thomas Addis Emmet, | 91 Madison av., | New York |
| 1891 | George A. Evans, | Brooklyn, | Kings |
| 1898 | Henry A. Fairbairn, | Brooklyn, | Kings |
| 1889 | Jas. D. Featherstonhaugh | Cohoes, | Albany |
| 1892 | Mahlon Felter, | Troy, | Rensselaer |
| 1900 | Charles G. J. Finn, | Hempstead, | Queens |
| 1890 | Edward D. Fisher, | 42 West 45th st., | New York |
| 1896 | Arthur Lyman Fisk, | 41 West 50th st., | New York |
| 1888 | Henry Flood, | Elmira, | Chemung |
| 1888 | Willis E. Ford, | Utica, | Oneida |
| 1896 | John Addison Fordyce, | 66 Park av., | New York |
| 1899 | Henry Hall Forbes, | 96 Park av., | New York |
| 1889 | George R. Fowler, | Brooklyn, | Kings |
| 1882 | George Henry Fox, | 18 East 31st st., | New York |
| 1902 | Rowland G. Freeman, | 205 West 57th st., | New York |
| 1862 | *Samuel H. Freeman* (1886) | Albany, | Albany |
| 1891 | Crawford E. Fritts, | Hudson, | Columbia |
| 1897 | Henry P. Frost, | Buffalo, | Erie |
| 1899 | Jacob Fuhs, | Brooklyn, | Kings |
| 1893 | Earl D. Fuller, | Utica, | Oneida |
| 1902 | Henry L. Furbeck, | St. Johnsville, | Montgomery |
| 1897 | William D. Garlock, | Little Falls, | Herkimer |

| Year of Election | | | County |
|---|---|---|---|
| 1902 | Henry A. Gates, | Delhi, | Delaware |
| 1885 | John Gerin, | Auburn, | Cayuga |
| 1887 | Arpad G. Gerster, | 34 East 75th st., | New York |
| 1884 | Virgil P. Gibney, | 16 Park av., | New York |
| 1899 | Charles Langdon Gibson, | 48 West 49th st., | New York |
| 1893 | William M. Gibson, | Utica, | Oneida |
| 1902 | Herbert F. Gillette | Cuba, | Allegany |
| 1889 | James H. Glass, | Utica, | Oneida |
| 1891 | De Witt A. Gleason, | Oxford, | Chenango |
| 1901 | W. Stanton Gleason, | Newburg, | Orange |
| 1900 | Charles H. Glidden, | Little Falls, | Herkimer |
| 1883 | *I. N. Goff* (1896), | Cazenovia, | Madison |
| 1900 | J. Riddle Goffe, | 29 West 46th st., | New York |
| 1892 | D. H. Goodwillie, | 154 West 34th st., | New York |
| 1896 | Hermon C. Gordinier, | Troy, | Rensselaer |
| 1897 | Egbert H. Grandin, | 36 East 58th st., | New York |
| 1894 | George Graves, | Herkimer, | Herkimer |
| 1881 | Henry Gray, | Greenwich, | Washington |
| 1901 | Emil Gruening, | 109 East 23rd st., | New York |
| 1902 | Ramon Guiteras, | 75 West 55th st., | New York |
| 1888 | Alexander Hadden, | 155 East 51st st., | New York |
| 1887 | William Hailes, | Albany, | Albany |
| 1897 | Lorenzo Hale, | Albany, | Albany |
| 1897 | Orlando J. Hallenbeck, | Canandaigua, | Ontario |
| 1898 | Thomas H. Halsted, | Syracuse, | Onondaga |
| 1892 | John B. Harvie, | Troy, | Rensselaer |
| 1899 | Hickson F. Hart, | Shrub Oak, | Westchester |
| 1895 | Josiah Hasbrouck, | Port Ewen, | Ulster |
| 1899 | Wm. Henry Haskin, | New York, | New York |
| 1894 | Herman E. Hayd, | Buffalo, | Erie |
| 1889 | John L. Heffron, | Syracuse, | Onondaga |
| 1898 | Alfred W. Henckell, | Rochester, | Monroe |
| 1889 | Edgar M. Hermance, | Yonkers, | Westchester |
| 1894 | Wallace J. Herriman, | Rochester, | Monroe |
| 1900 | Francis W. Higgins, | Cortland, | Cortland |
| 1885 | Henry R. Hopkins, | Buffalo, | Erie |
| 1898 | D. Walker Houston, | Troy, | Rensselaer |
| 1874 | *Bleecker L. Hovey* (1885) | Rochester, | Monroe |
| 1891 | Eugene H. Howard, | Rochester, | Monroe |
| 1892 | Wm. R. Howard, | Rochester, | Monroe |
| 1886 | Lucien Howe, | Buffalo, | Erie |
| 1891 | John T. Howell, | Newburgh, | Orange |
| 1896 | Joseph B. Hullett, | Middletown, | Orange |
| 1893 | Henry Hun, | Albany, | Albany |
| 1899 | Dwight W. Hunter, | 80 West 40th st., | New York |
| 1897 | George Huntington, | La Grangeville, | Dutchess |
| 1901 | Arthur W. Hurd, | Buffalo, | Erie |
| 1894 | Joel W. Hyde, | Brooklyn, | Kings |
| 1893 | George T. Jackson | 14 East 31st st., | New York |
| 1875 | Abraham Jacobi, | 19 East 47th st., | New York |
| 1892 | Nathan Jacobson, | Syracuse, | Onondaga |
| 1893 | Walter W. Jamieson, | Syracuse, | Onondaga |
| 1895 | Reuben Jeffery, | Brooklyn, | Kings |
| 1886 | Charles Jewett, | Brooklyn, | Kings |
| 1897 | Frederick A. Jewett, | Brooklyn, | Kings |
| 1901 | John H. Jewett, | Canandaigua, | Ontario |
| 1899 | Henrietta P. Johnson, | 206 East 15th st., | New York |
| 1899 | George P. Johnston, | Mexico, | Oswego |
| 1882 | Wm. H. Johnston, | Port Leydon, | Lewis |
| 1900 | William B. Jones, | Rochester, | Monroe |

| Year of Election | | | County |
|---|---|---|---|
| 1900 | Andrew V. Jova, | Newburgh, | Orange |
| 1902 | James E. Kelly, | 117 East 59th st., | New York |
| 1896 | Judson G. Kilbourn, | Utica, | Oneida |
| 1901 | James W. King, | Stottville, | Columbia |
| 1891 | Osman F. Kinloch, | Troy, | Rensselaer |
| 1899 | Cyrile P. Kirley, | Lowville, | Lewis |
| 1880 | Herman Knapp, | 26 West 40th st., | New York |
| 1901 | James W. Knapp, | Canastota, | Madison |
| 1898 | William C. Krauss, | Buffalo, | Erie |
| 1895 | Austin La Monte, | Carmel, | Putnam |
| 1898 | Wilbur F. Lamont, | Catskill, | Greene |
| 1896 | Louis Nott Lanehart, | Hempstead, | Queens |
| 1890 | Charles M. Leller, | Gloversville, | Fulton |
| 1893 | Wm. H. Leonard, | Worcester, | Otsego |
| 1890 | Maurice J. Lewi, | 120 West 81st st., | New York |
| 1884 | Daniel Lewis, | 252 Madison av., | New York |
| 1902 | Robert Lewis, Jr., | 48 West 40th st., | New York |
| 1892 | Samuel Lloyd, | 12 West 50th st., | New York |
| 1892 | Eli H. Long, | Buffalo, | Erie |
| 1901 | Earl P. Lothrop, | Buffalo, | Erie |
| 1882 | E. H. Loughran, | Kingston, | Ulster |
| 1899 | Bradford C. Loveland, | Syracuse, | Ontario |
| 1871 | Frank S. Low, | Pulaski, | Oswego |
| 1898 | David S. Lucas, | Brooklyn, | Kings |
| 1902 | William V. V. Mabon, | Ogdensburg, | St. Lawrence |
| 1891 | Carlos F. MacDonald, | 85 Madison av., | New York |
| 1902 | Alexander E. Macdonald | Manhat. State Hosp., | New York |
| 1895 | Willis G. Macdonald, | Albany, | Albany |
| 1896 | John C. MacEvitt, | Brooklyn, | Kings |
| 1900 | Andrew MacFarlane, | Albany, | Albany |
| 1902 | Roderick C. McClennan, | Syracuse, | Onondaga |
| 1902 | James F. McKernon, | 62 West 52d st., | New York |
| 1894 | Frank Madden, | Plattsburgh, | Clinton |
| 1890 | William M. Maddren, | Brooklyn, | Kings |
| 1893 | A. H. Mambert, | Rondout, | Ulster |
| 1901 | Frederick A. Mandeville, | Rochester, | Monroe |
| 1895 | John Mann, | Jericho, | Queens |
| 1897 | Matthew D. Mann, | Buffalo, | Erie |
| 1902 | Francis H. Markoe, | 15 East 49th st., | New York |
| 1891 | Frank W. Marlow, | Syracuse, | Onondaga |
| 1889 | A. Ross Matheson, | Brooklyn, | Kings |
| 1879 | Arthur Mathewson, | Brooklyn, | Kings |
| 1899 | Sands C. Maxson, | Utica, | Oneida |
| 1901 | E. S. McClellan, | Saranac Lake, | Franklin |
| 1894 | George M. McCombs, | Frankfort, | Herkimer |
| 1894 | John A. McCorkle, | Brooklyn, | Kings |
| 1895 | George McNaughton, | Brooklyn, | Kings |
| 1900 | Edward Meany, | Ithaca, | Tompkins |
| 1884 | *Alfred Mercer* (1899), | Syracuse, | Onondaga |
| 1898 | A. Clifford Mercer, | Syracuse, | Onondaga |
| 1897 | Henry E. Mereness, | Albany, | Albany |
| 1900 | Edwin H. Merriam, | Coxsackie, | Greene |
| 1888 | Cyrus S. Merrill, | Albany, | Albany |
| 1897 | George V. R. Merrill, | Elmira, | Chemung |
| 1892 | Willy Meyer, | 700 Madison av., | New York |
| 1895 | Aaron B. Miller, | Syracuse, | Onondaga |
| 1888 | Lewis H. Miller, | Brooklyn, | Kings |
| 1892 | Theodore D. Mills, | Middletown, | Orange |
| 1886 | Wm. F. Mittendorf, | 140 Madison av., | New York |
| 1891 | Joseph Moffatt, | Washingtonville, | Orange |

| Year of Election | | | County |
|---|---|---|---|
| 1896 | Edward L. Mooney, | Syracuse, | Onondaga |
| 1896 | William A. Moore, | Binghamton, | Broome |
| 1896 | John Moroney, | Elmira, | Chemung |
| 1892 | Robert T. Morris, | 58 West 56th st., | New York |
| 1898 | Robert J. Morrison, | Brooklyn, | Kings |
| 1895 | Samuel R. Morrow, | Albany, | Albany |
| 1896 | William James Morton, | 19 East 28th st., | New York |
| 1896 | J. Montgomery Mosher, | Albany, | Albany |
| 1894 | Edward W. Mulligan, | Rochester, | Monroe |
| 1902 | Dwight H. Murray, | Syracuse, | Onondaga |
| 1899 | Grace Peckham Murray, | 661 Fifth av., | New York |
| 1896 | T. Halsted Myers, | 54 West 50th st., | New York |
| 1898 | Herman V. Mynderse, | Schenectady, | Schenectady |
| 1892 | Herman Mynter, | Buffalo, | Erie |
| 1898 | Charles D. Napier, | Brooklyn, | Kings |
| 1902 | Lewis Knode Neff, | 1213 Park av., | New York |
| 1893 | William J. Nellis, | Albany, | Albany |
| 1892 | Albert S. Newcomb, | 206 West 71st st., | New York |
| 1902 | Henry S. Norris, | 10 West 49th st., | New York |
| 1895 | William P. Northrup, | 57 East 79th st., | New York |
| 1890 | George H. Oliver, | Malone, | Franklin |
| 1890 | May R. Owen, | Brooklyn, | Kings |
| 1893 | Albert H. Palmer, | Marlborough, | Ulster |
| 1892 | Roswell Park, | Buffalo, | Erie |
| 1897 | Frederick H. Parker, | Auburn, | Cayuga |
| 1895 | Clair S. Parkhill, | Hornellsville, | Steuben |
| 1863 | *W.H.H.Parkhurst* (1883) | Frankfort, | Herkimer |
| 1902 | John Parmenter, | Buffalo, | Erie |
| 1887 | Edward L. Partridge, | 19 Fifth av., | New York |
| 1899 | Daniel P. Pease, | 9 West 24th st., | New York |
| 1893 | O. W. Peck, | Oneonta, | Otsego |
| 1899 | Fayette H. Peck, | Utica, | Oneida |
| 1881 | *Solomon H. Peck* (1892), | Ithaca, | Tompkins |
| 1902 | James Pedersen, | 29 East 44th st., | New York |
| 1893 | T. Kirkland Perry, | Albany, | Albany |
| 1891 | Wendell C. Phillips, | 350 Madison av., | New York |
| 1883 | A. M. Phelps, | 62 East 34th st., | New York |
| 1891 | Lewis S. Pilcher, | Brooklyn, | Kings |
| 1894 | Milton G. Planck, | Schenectady, | Schenectady |
| 1896 | Warren O. Plimpton, | 19 West 84th st., | New York |
| 1897 | John Osborne Polak, | Brooklyn, | Kings |
| 1893 | George P. K. Pomeroy, | Stuyvesant, | Columbia |
| 1881 | Thomas R. Pooley, | 107 Madison av., | New York |
| 1869 | *Charles H. Porter* (1900), | Albany, | Albany |
| 1897 | Marion Craig Potter, | Rochester, | Monroe |
| 1883 | Wm. Warren Potter, | Buffalo, | Erie |
| 1893 | J. Wilson Poucher, | Poughkeepsie, | Dutchess |
| 1892 | Seneca D. Powell, | 12 West 40th st., | New York |
| 1879 | *Jonathan S.Prout* (1897), | Brooklyn, | Kings |
| 1897 | John H. Pryor, | Buffalo, | Erie |
| 1877 | Alfred E. M. Purdy, | 304 Madison av., | New York |
| 1899 | Barna E. Radeker, | Deposit, | Broome |
| 1896 | Julius B. Ransom, | Dannemora, | Clinton |
| 1900 | James E. Reed, | Schenectady, | Schenectady |
| 1894 | Charles M. Rexford, | Watertown, | Jefferson |
| 1889 | Clarence C. Rice, | 123 East 19th st., | New York |
| 1900 | Nelson G. Richmond, | Fredonia, | Chautauqua |
| 1896 | DeWitt C. Rodenhurst, | Philadelphia, | Jefferson |
| 1882 | John O. Roe, | Rochester, | Monroe |
| 1878 | D. B. St. John Roosa, | 20 East 30th st., | New York |

| Year of Election | | | County |
|---|---|---|---|
| 1900 | Arthur G. Root, | Albany, | Albany |
| 1898 | Lewis W. Rose, | Rochester, | Monroe |
| 1898 | George W. Rossman, | Ancram, | Columbia |
| 1900 | James E. Sadlier, | Poughkeepsie, | Dutchess |
| 1891 | Thomas E. Satterthwaite | 7 East 80th st., | New York |
| 1899 | Reginald H. Sayre, | 285 Fifth av., | New York |
| 1901 | Peter Scott, | Brooklyn, | Kings |
| 1897 | Frederick W. Sears, | Syracuse, | Onondaga |
| 1901 | Frank M. Severson, | Seneca Falls, | Seneca |
| 1885 | *George Seymour* (1900), | Utica, | Oneida |
| 1893 | William W. Seymour, | Troy, | Rensselaer |
| 1897 | Friend W. Shaffer, | Gloversville, | Fulton |
| 1898 | John E. Sheppard, | Brooklyn, | Kings |
| 1884 | Samuel Sherwell, | Brooklyn, | Kings |
| 1901 | Frederic J. Shoop, | Brooklyn, | Kings |
| 1870 | George F. Shrady, | 8 East 66th st., | New York |
| 1902 | William Simmons, | Brooklyn, | Kings |
| 1898 | William H. Skene, | Brooklyn, | Kings |
| 1900 | Erasmus D. Skinner, | Mineola, | Queens |
| 1897 | Frederick W. Slocum, | Camillus, | Onondaga |
| 1899 | Charles E. Smith, | Whitesboro, | Oneida |
| 1893 | H. Lyle Smith, | Hudson, | Columbia |
| 1900 | Nathan Smith, | Richmondville, | Schoharie |
| 1902 | Sargent F. Snow, | Syracuse, | Onondaga |
| 1886 | James D. Spencer, | Watertown, | Jefferson |
| 1902 | Henry S. Stearns, | 45 West 58th st., | New York |
| 1890 | Byron U. Steenberg, | Albany, | Albany |
| 1902 | F. H. Stephenson, | Syracuse, | Onondaga |
| 1900 | Alexander A. Stern, | Kingston, | Ulster |
| 1892 | William Stevens, | 70 West 52nd st., | New York |
| 1879 | Charles L. Stiles, | Owego, | Tioga |
| 1901 | David V. Still, | Johnstown, | Fulton |
| 1897 | William O. Stillman, | Albany, | Albany |
| 1880 | Enoch V. Stoddard, | Rochester, | Monroe |
| 1889 | Charles Stover, | Amsterdam, | Montgomery |
| 1882 | Frederic R. Sturgis, | 16 West 32nd st., | New York |
| 1885 | A. Walter Suiter, | Herkimer, | Herkimer |
| 1892 | Peter L. Suits, | Tribe's Hill, | Montgomery |
| 1896 | Leander Swartwout, | Prospect, | Oneida |
| 1896 | T. Oliver Tait, | Rochester, | Monroe |
| 1900 | John H. Taylor, | Holley, | Orleans |
| 1898 | John Warren Thorp, | Oxford, | Chenango |
| 1897 | C. F. Timmerman, | Amsterdam, | Montgomery |
| 1900 | William A. Tomes, | Brooklyn, | Kings |
| 1888 | David M. Totman, | Syracuse, | Onondaga |
| 1897 | C. Wilmot Townsend, | New Brighton, | Richmond |
| 1896 | Wisner R. Townsend, | 25 West 53rd st., | New York |
| 1902 | C. Howard Travell, | Troy, | Rensselaer |
| 1889 | Willis G. Tucker, | Albany, | Albany |
| 1880 | Robert K. Tuthill, | Poughkeepsie, | Dutchess |
| 1892 | Francis Valk, | 164 East 61st st., | New York |
| 1895 | T. F. C. Van Allen, | Albany, | Albany |
| 1895 | Joshua M. Van Cott, | Brooklyn, | Kings |
| 1902 | John Vanderpoel, | 36 West 39th st., | New York |
| 1889 | S. O. Vanderpoel, | 47 East 25th st., | New York |
| 1899 | Waldron B. Vanderpoel, | 106 East 24th st., | New York |
| 1876 | Albert Vander Veer | Albany, | Albany |
| 1902 | Ely Van de Warker, | Syracuse, | Onondaga |
| 1901 | Charles M. Van Dyke, | Himrod, | Yates |
| 1899 | Frank Van Fleet, | 63 East 79th st., | New York |

| Year of Election | | | County |
|---|---|---|---|
| 1900 | Howard Van Rensselaer, | Albany, | Albany |
| 1886 | Eugene Van Slyke, | Albany, | Albany |
| 1895 | Adam T. Van Vranken, | Watervliet, | Albany |
| 1898 | Major A. Veeder, | Lyons, | Wayne |
| 1890 | Waterman A. Vincent, | Three-Mile Bay, | Jefferson |
| 1899 | Charles G. Wagner, | Binghamton, | Broome |
| 1892 | Ralph Waldo, | 68 West 50th st., | New York |
| 1886 | Theodore C. Wallace, | Cambridge, | Washington |
| 1895 | John J. Walsh, | Buffalo, | Erie |
| 1901 | James P. Warbasse, | Brooklyn, | Kings |
| 1896 | David B. Ward, | Poughkeepsie, | Dutchess |
| 1873 | R. Halstead Ward, | Troy, | Rensselaer |
| 1883 | Samuel B. Ward | Albany, | Albany |
| 1885 | *John S. Warren* (1898), | 150 West 48th st., | New York |
| 1883 | David Webster, | 327 Madison av., | New York |
| 1901 | William S. Webster, | Liberty, | Sullivan |
| 1898 | George C. Weiss, | Mt. Vernon, | Westchester |
| 1895 | Ernest Wende, | Buffalo, | Erie |
| 1901 | Grover W. Wende, | Buffalo, | Erie |
| 1896 | George T. Wetmore, | 36 West 35th st., | New York |
| 1899 | William E. Wetmore, | Utica, | Oneida |
| 1894 | Hamilton D. Wey, | Elmira, | Chemung |
| 1889 | John T. Wheeler, | Chatham, | Columbia |
| 1883 | John W. Whitbeck, | Rochester, | Monroe |
| 1902 | Frederick Whiting, | 47 West 50th st., | New York |
| 1895 | Reynold W. Wilcox, | 749 Madison av., | New York |
| 1898 | Alfred G. Wilding, | Malone, | Franklin |
| 1892 | Robert G. Wilding, | Malone, | Franklin |
| 1883 | Charles E. Willard, | Catskill, | Greene |
| 1898 | Edward S. Willard, | Watertown, | Jefferson |
| 1895 | George O. Williams, | Greene, | Chenango |
| 1893 | Henry T. Williams, | Rochester, | Monroe |
| 1901 | Herbert U. Williams, | Buffalo, | Erie |
| 1895 | James McF. Winfield, | Brooklyn, | Kings |
| 1881 | Charles E. Witbeck, | Cohoes, | Albany |
| 1892 | George H. Witter, | Wellsville, | Allegany |
| 1889 | Rudolph A. Witthaus, | 45 West 32nd st., | New York |
| 1900 | George H. Wood | Antwerp, | Jefferson |
| 1895 | J. Walter Wood, | Port Richmond, | Richmond |
| 1897 | W. Gill Wylie, | 28 West 40th st., | New York |
| 1901 | Edward J. Wynkoop, | Syracuse, | Onondaga |
| 1900 | Charles D. Young, | Rochester, | Monroe |
| 1895 | Frederick W. Zimmer, | Rochester, | Monroe |

## III. Honorary Members

| Year of Election | | Year of Election | |
|---|---|---|---|
| 1889 | Francis Bacon, New Haven, Connecticut | 1892 | W. E. B. Davis, Birmingham, Ala. |
| 1888 | B. F. Baer, Philadelphia, Pa. | 1900 | John B. Deaver, Philadelphia, Pa. |
| 1882 | R. Bartholow, Philadelphia, Pa. | 1875 | F. Dichiara, Palermo, Italy |
| 1880 | J. S. Billings, Philadelphia, Pa. | 1890 | G. J. Engelmann, St. Louis, Mo. |
| 1877 | W. A. F. Brown, Dumphries, Scotland | 1875 | E. H. Gregory, St. Louis, Mo. |
| 1886 | E. N. Brush, Baltimore, Md. | 1887 | A. P. Grinnell, Burlington, Vt. |
| 1881 | J. C. Bucknill, London, Eng. | 1886 | T. Hansen, Copenhagen, Denmark |
| 1894 | Arthur T. Cabot, Boston, Mass. | 1889 | Reginald Harrison, Liverpool, England |
| 1885 | T. S. Clouston, Edinburgh, Scotland | | |
| 1866 | N. S. Davis, Chicago, Ill. | | |

Year of Election

1879 C. Heath, London, England
1894 O. E. Herrick, Grand Rapids, Michigan
1882 C. N. Hewitt, Red Wing, Minn.
1891 W. H. Hingston, Montreal, Canada
1877 W. S. Hopkins, Vergennes, Vt.
1857 H. J. Hunter, Sheffield, England
1891 J. Nevins Hyde, Chicago, Ill.
1870 Ralph Isham, Chicago, Ill.
1899 William W. Keen, Philadelphia, Pa.
1887 E. Landolt, Paris, France
1873 H. C. Lombard, Geneva, Switzerland
1871 W. McCollum, Brooklyn, N. Y.
1897 J. Lee McComas, Oakland, Md.
1892 Lewis S. McMurtry, Louisville, Kentucky
1872 R. McNamara, Dublin, Ireland
1889 Howard Marsh, London, Eng.
1898 Joseph M. Matthews, Louisville, Ky.
1879 L. A. Mercier, Paris, France
1877 S. Weir Mitchell, Philadelphia, Pa.
1891 E. E. Montgomery, Philadelphia, Pa.

Year of Election

1899 William Osler, Baltimore, Md.
1894 J. H. Packard, Philadelphia, Pa.
1891 Joseph Price, Philadelphia, Pa.
1892 Chas. A. L. Reed, Cincinnati, Ohio
1899 Maurice H. Richardson, Boston, Mass.
1902 B. Merrill Ricketts, Cincinnati, Ohio
1882 Sidney Ringer, London, Eng.
1883 C. L. Robertson, London, Eng.
1892 Jas. F. W. Ross, Toronto, Can.
1889 Max Schede, Hamburg, Germany
1888 F. J. Shepherd, Montreal, Can.
1894 George M. Sternberg, Washington, D. C.
1873 R. Stokes, Dublin, Ireland
1894 I. S. Stone, Washington, D. C.
1881 W. H. Taylor, Cincinnati, O.
1873 T. J. Turner, U. S. Navy
1872 R. Virchow, Berlin, Germany
1902 J. Collins Warren, Boston, Mass.
1877 L. de Wecker, Paris, France
1891 H. C. Wood, Philadelphia, Pa.
1892 A. H. Wright, Toronto, Can.

# COUNTY MEDICAL SOCIETIES*

## MEDICAL SOCIETY OF THE COUNTY OF ALBANY.

(Organized in 1806.)

MEETINGS.—Annual, second Tuesday in May; semi-annual, second Tuesday in October. Stated meetings are held Wednesday evening at Alumni Hall, Albany Medical College, at least once a month, from October to May.

*Officers.* (May, 1902.)

S. B. Ward, Albany.....*President*
James P. Boyd, Albany.....*Vice-President*
A. W. Elting, Albany.....*Secretary*
William H. George, Albany.....*Treasurer*

*Censors:* J. M. Mosher, F. C. Curtis, W. G. Macdonald, Andrew MacFarlane and A. Vander Veer, all of Albany.

Number of Members, 138.

## MEDICAL SOCIETY OF THE COUNTY OF ALLEGANY.

(Date of organization unknown.)

MEETINGS.—Annual, second Wednesday in May; quarterly, second Wednesday in August, November, and February.

*Officers.* (List not revised.)

J. P. Crosby, Belmont.....*President*
A. E. Persons, Friendship.....*Vice-President*
H. A. Barney, Belmont.....*Secretary and Treasurer*

*Censors:* George E. Burdick, Andover; J. W. Collar, H. A. Barney, G. H. Witter, J. C. Young.

Number of Members, 37.

## MEDICAL SOCIETY OF THE COUNTY OF BROOME.

(Organized July 4, 1806.)

MEETINGS.—Annual, first Tuesday in October; quarterly, first Tuesday in January, April, and July.

*Officers...* (October, 1901.)

E. N. Christopher, Union.....*President*
W. S. Overton, Binghamton.....*Vice-President*
Jack Killen, Binghamton.....*Secretary*
E. H. Wells, Binghamton.....*Treasurer*

*Censors:* J. G. Orton, Binghamton; J. H. Chittenden, J. M. Farrington, R. A. Seymour, A. F. Taylor.

Number of Members, 62.

* For Delegates to the State Medical Society, see Delegates. The usual lists of members of the County Societies are omitted from this volume because of the increased amount of material entailed by the semi-annual meeting.

## MEDICAL SOCIETY OF THE COUNTY OF CATTARAUGUS.

MEETINGS. Annual, at Salamanca, the first Tuesday in May; quarterly, on the first Tuesday in August, November, and February.

*Officers.* (May, 1902.)

Cassar Smith, Olean.....*President*
G. W. Winterstine, Portville.....*Vice-President*
J. S. Wright, Little Valley.....*Secretary and Treasurer*

*Censors:* J. E. K. Morris, Olean; A. D. Lake, Gowanda; F. C. Beals, Salamanca.

*Deceased:* John L. Eddy, Olean, March 30, 1902, æt. 73.

Number of Members, 54.

## MEDICAL SOCIETY OF THE COUNTY OF CAYUGA.

MEETINGS.—Annual, second Thursday in May; semi-annual, second Thursday in November. Regular meeting the second Thursday in August and February.

*Officers.* (List not revised.)

B. I. C. Buckland, Fleming.....*President*
R. W. Robinson, Auburn.....*Vice-President*
Andrew J. Forman, Auburn.....*Secretary*
A. W. Gilmore, Auburn.....*Treasurer*

*Committee on Hygiene:* F. Sefton, Auburn; S. Voorhees, M. D. Blaine.

Number of Members, 61.

## MEDICAL SOCIETY OF THE COUNTY OF CHAUTAUQUA.

MEETINGS.—Annual, second Tuesday in July; semi-annual, second Tuesday in December.

*Officers.* (July, 1901.)

V. M. Griswold, Westerly, R. I.....*President*
E. A. Schofield, Bemus Point.....*Vice-President*
J. W. Morris, Jamestown.....*Secretary and Treasurer*

*Censors:* George E. Blackham, T. D. Strong, William M. Bemus.

*Deceased:* H. J. Dean, Brocton, October 11, 1901; H. R. Rodgers, Dunkirk, October 19, 1901, æt. 79.

Number of Members, 70.

## MEDICAL SOCIETY OF THE COUNTY OF CHEMUNG.

(Organized May 6, 1836.)

MEETINGS.—Annual, third Tuesday in May; quarterly, third Tuesday in August, November, and February.

*Officers.* (May, 1902.)

O. J. Bowman, Horseheads.....*President*
H. D. Wey, Elmira.....*Vice-President*
Emma C. Le Fevre, Elmira.....*Secretary*
G. V. R. Merrill, Elmira.....*Treasurer*

*Censors:* N. H. Soble, Jessie L. Herrick, Arthur W. Booth, C. W. M. Brown, C. G. R. Jennings.

Number of Members, 47.

## MEDICAL SOCIETY OF THE COUNTY OF CHENANGO.

(Organized in 1806.)

MEETINGS.—Annual, second Tuesday in January; semi-annual, second Tuesday in June.

*Officers.* (1902.)

Reuben Jeffery, Norwich.....*President*
L. A. Van Wagner, Sherburne.....*Vice-President*
Linn Emerson, Oxford.....*Secretary*
S. M. Hand, Norwich.....*Treasurer*

*Censors:* Drs. T. G. Packer, D. A. Gleason and S. M. Hand.

Number of Members, 49.

## MEDICAL SOCIETY OF THE COUNTY OF CLINTON.

(Organized October 6, 1807.)

MEETINGS.—Annual, second Tuesday in January; semi-anual, second Tuesday in July.

*Officers.* (January, 1902.)

H. E. Centre, Schuyler Falls.....*President*
Robert H. Lamb, Dannemora.....*Vice-President*
D. S. Kellogg, Plattsburgh.....*Secretary*
F. Madden, Plattsburgh.....*Treasurer*

Number of Members, 39.

## MEDICAL SOCIETY OF THE COUNTY OF COLUMBIA.

MEETINGS.—Annual, first Tuesday in May, at City Hall, Hudson; semi-annual, first Tuesday in October at Kinderhook.

*Officers.* (May, 1902.)

W. G. Gardiner, Claverack.....*President*
C. G. Rossman, Hudson.....*Vice-President*
T. Floyd Woodworth, Kinderhook.....*Secretary and Treasurer*

*Censors:* N. H. Mesick, Glenco Mills; G. P. K. Pomeroy, Stuyvesant; N. D. Gurnsey, Kinderhook; E. E. Martin, Stottville; Henry W. Johnson, Hudson.

*Deceased:* A. R. Van Duesen, Claverack, August 21, 1901, æt. 81.

Number of Members, 49.

## MEDICAL SOCIETY OF THE COUNTY OF CORTLAND.

(Organized, August 10, 1808.)

MEETINGS.—Annual, second Thursday in June; semi-annual, second Thursday in December; quarterly, second Thursdays in September and March.

*Officers.* (1902.)

Philip M. Neary, Cortland.....*President*
Henry T. Dana, Cortland.....*Vice-President*
Frank H. Green, Homer *Secretary, Treasurer and Librarian*

*Censors:* H. T. Dana, J. W. Whitney, H. C. Hendrick, F. W. Higgins, F. D. Reese.

*Deceased:* Dr. Sumner C. Webb, Homer, December 29, 1901.

Number of Members, 29.

## MEDICAL SOCIETY OF THE COUNTY OF DELAWARE.

(Organized July 1, 1806.)

MEETINGS.—Annual, second Tuesday in June; semi-annual, in the Fall.

*Officers.* (1902.)

C. S. Allaben, Margaretville.....*President*
George L. Hubbel, Hobart.....*Vice-President*
Stanton Hendrick, Treadwell.....*Secretary*
George H. Reynolds, Delhi.....*Treasurer*

*Censors:* Thomas Wight, G. C. Smith, H. A. Gates, J. N. Wright.

New members elected at annual meeting: A. H. Rabuck, Bovina; Floyd Palmer, East Meredith; John E. Safford, Stamford; C. G. Lyon, Davenport Centre; George L. Hubbel, Hobart; Howard J. Goodrich Delhi; George S. Brown, Margaretville.

Number of Members, 38.

## MEDICAL SOCIETY OF THE COUNTY OF DUTCHESS.

(Organized in 1806.)

MEETINGS.—Annual, second Wednesday in January, at Poughkeepsie; semi-annual, second Wednesday in June.

*Officers.* (January, 1902.)

J. E. Sadlier, Poughkeepsie.....*President*
M. T. Pultz, Stanfordville.....*Vice-President*
Robert W. Andrews, Poughkeepsie.....*Secretary*
D. B. Ward, Poughkeepsie.....*Treasurer*

*Censors:* Alfred Hasbrouck, Robert K. Tuthill, E. H. Gerow.

*Deceased:* G. M. Wellman, Dover Plains, January 13, 1902, æt. 65; John G. Elliott, Poughkeepsie, May 12, 1901, æt. 31.

Number of Members, 69.

## MEDICAL SOCIETY OF THE COUNTY OF ERIE.

MEETINGS.—Annual, second Tuesday in January; semi-annual, second Tuesday in June.

*Officers.* (1902.)

Walden M. Ward, North Collins.....*President*
Ernest Wende, Buffalo.....*Vice-President*
Franklin C. Gram, 460 Glenwood av, Buffalo.....*Secretary*
Edward Clark, Buffalo.....*Treasurer*
Wm. C. Callanan.....*Librarian*

*Censors:* J. B. Coakley, Henry C. Lapp, F. E. Fronczak, H. R. Hopkins, Irving W. Potter.

*Committee on Legislature:* Ernest Wende, Wm. Warren Potter, Edward Clarke.

Number of Members, 319.

## MEDICAL SOCIETY OF THE COUNTY OF ESSEX.

ANNUAL MEETINGS.—Third or fourth Tuesday in May.

M. J. La Bell, Lewis.....*President*
V. A. Marshall, Moriah Centre.....*Vice-President*
W. E. Pattison, Westford.....*Acting Secretary and Treasurer*

*Censors:* W. E. Pattison, W. T. Sherman, Robert T. Saville.

Number of Members, 20.

## MEDICAL SOCIETY OF THE COUNTY OF FRANKLIN.

(Organized in 1814; reorganized in 1848.)

MEETINGS.—Annual, first Tuesday in January; semi-annual, first Tuesday in June; quarterly, first Tuesday in September.

*Officers.* (January, 1902.)

E. S. McClellan, Saranac Lake.....*President*
S. D. Williamson, Malone.....*Vice-President*
R. J. Wilding, Malone.....*Secretary and Treasurer*

*Censors:* G. H. Oliver, W. N. MacArtney.

Number of Members, 43.

## MEDICAL SOCIETY OF THE COUNTY OF FULTON.

MEETINGS. Annual, second Thursday in January; semi-annual, second Thursday in June.

*Officers.* (List not revised.)

Nelson Everest, Gloversville.....*President*
John Hagar, Gloversville.....*Vice-President*
Emily L. Hill, Gloversville.....*Secretary*
M. F. Drury, Gloversville.....*Treasurer*

*Censors:* L. R. Ellithorpe, Johnstown; C. B. Mosher, E. H. Goodfellow.

*Deceased:* Peter R. Furbeck, Gloversville, January 17, 1902, æt 67.

Number of Members, 33.

## MEDICAL SOCIETY OF THE COUNTY OF GENESEE.

(Organized about 1811.)

MEETINGS.—Annual, second Tuesday in June; semi-annual, second Tuesday in January, at Batavia.

(Society at present not in active existence.)

## MEDICAL SOCIETY OF THE COUNTY OF GREENE.

(Organized July, 1806; Incorporated June 14, 1896.)

MEETINGS.—Annual, second Tuesday in May; semi-annual, second Tuesday in October; quarterly, second Tuesday in July and January.

*Officers.* (1902.)

George Haner, Tannersville.....*President*
P. G. Waller, New Baltimore.....*Vice-President*
Robert Selden, Catskill.....*Secretary*
C. E. Willard, Catskill.....*Treasurer*

Number of Members, 36.

## MEDICAL SOCIETY OF THE COUNTY OF HERKIMER.

(Organized August 5, 1806.)

MEETINGS.—Annual, first Tuesday in March at the Court-house in Herkimer; semi-annual, first Tuesday in September; quarterly, first Tuesday in June and December. The place for all meetings, except the annual, is designated at the annual meeting.

*Officers.* (March, 1901.)

Ward E. Hunt, Little Falls.....*President*
C. B. Trafford, Middleville.....*1st Vice-President*
Delavan E. Walker, Ilion.....*2d Vice-President*
George M. McCombs, Frankfort.....*3d Vice-President*
A. Walter Suiter, Herkimer.....*Secretary*
George Graves, Herkimer.....*Treasurer*
Maynard G. Burgess.....*Librarian*

*New Members:* Wm. H. Young, Starkville; John L. Crofts, Little Falls; Wm. P. Earl, Little Falls; Stuart W. Nelson, Old Forge; T. B. O'Neil, Ilion; F. B. Casey, Mohawk; A. C. Douglass, Ilion.

*Deceased:* John D. Young, Starkville, January, 1902.

Number of Members, 56.

## MEDICAL SOCIETY OF THE COUNTY OF JEFFERSON.

MEETINGS.—Annual, second Tuesday in January; semi-annual, second Tuesday in July; quarterly second Tuesday in April and October.

*Officers.* (List not revised.)

H. H. Deane, Watertown.....*President*
C. S. Drury, Natural Bridge.....*Vice-President*
F. R. Calkins, Watertown.....*Secretary*
C. M. Rexford, Watertown.....*Treasurer*

*Censors:* O. C. Eastman, Watertown; D. C. Rodenhurst, M. A. Vincent, C. F. Adams, J. M. Crawe.

Number of Members, 93.

## MEDICAL SOCIETY OF THE COUNTY OF KINGS.

MEETINGS.—Annual, third Tuesday in January; stated meeting, third Tuesday of other months; all meetings are held in Brooklyn, at 356 Bridge street, the permanent home of the society. A "Journal and Reading-Room" is open daily (except Sundays) from 10 A. M. to 10 P. M.; over two hundred journals are regularly on file. The library has recently been improved by the addition of several valuable works of reference and the best of the new medical monographs and text-books, and now contains more than 10,000 books and pamphlets. This Society also owns and publishes monthly The Brooklyn Medical Journal, which has now about 2000 subscribers.

*Officers.* (January, 1902.)

Henry A. Fairbairn, 249 McDonough st., Brooklyn.....*President*
Charles N. Cox, Brooklyn.....*Vice-President*
Wm. S. Hubbard, 97 Halsey st., Brooklyn.....*Secretary*
W. C. Woolsey, Brooklyn.....*Associate Secretary*
O. A. Gordon, Brooklyn.....*Treasurer*
John R. Stivers, Brooklyn.....*Associate Treasurer*
J. M. Winfield, Brooklyn.....*Librarian*

*Censors:* David Myerle, 572 Bedford av., Brooklyn; Walter C. Wood, Brooklyn; J. W. Van Cott, Brooklyn; Robert J. Morrison, Brooklyn; John E. Sheppard, Brooklyn.

*Deceased:* Henry M. Bishop, March 15, 1902, æt. 65; D. G. Bodkin, January 26, 1902, act. 68; G. W. Cushing, March 20, 1902, act. 56; J. E. Richardson, March 23, 1902, act. 51; James W. E. Coby, June 26, 1901, æt. 38; J. S. Wight, November 17, 1901, æt. 60.

Number of Members, 611.

## MEDICAL SOCIETY OF THE COUNTY OF LEWIS.

(Organized January 8, 1861.)

MEETINGS.—Annual, first Tuesday in June; semi-annual, first Tuesday in December.

*Officers.* (List not revised.)

C. P. Kirley, Lowville.....*President*
A. C. Miller, Turin.....*Vice-President*
W. O. Hubbard, Lowville.....*Secretary*
J. C. Hunt, Lowville.....*Treasurer*

Number of Members, 13.

## MEDICAL SOCIETY OF THE COUNTY OF LIVINGSTON.

(Organized June, 1806.)

MEETINGS.—Annual, second Tuesday in June; semi-annual, second Tuesday in December.

*Officers.* (List not revised.)

Edward C. Perry, Avon.....*President*
F. C. Burt, Dalton.....*Vice-President*
Edward A. Sharp, Sonyea.....*Secretary*
G. G. Jones, Geneseo.....*Treasurer*

*Censors:* J. P. Brown, Nunda; C. H. Richmond, R. J. Menzie, F. J. Bower, W. E. Lauderdale.

Number of Members, 43.

## MEDICAL SOCIETY OF THE COUNTY OF MADISON.

(Organized July 29, 1806.)

MEETINGS.—Annual, second Tuesday in May.

*Officers.* (List not revised.)

G. W. Davis, Peterboro.....*President*
F. C. Drake, Oneida.....*Vice-President*
E. H. Carpenter, Oneida.....*Secretary*
H. G. Germer, Canastota.....*Treasurer*

*Censors:* C. H. Perry, Oneida; I. N. Goff, E. P. Bailey, O. S. Langworthy, D. D. Chase.

Number of Members, 42.

## MEDICAL SOCIETY OF THE COUNTY OF MONROE.

MEETINGS.—Annual, last Wednesday in May.

*Officers.* (May, 1902.)

Charles R. Barber, 52 Cumberland st., Rochester.....*President*
Wheelock Rider, Rochester.....*Vice-President*
W. M. Brown, Rochester.....*Secretary*
C. A. Greenleaf, Rochester.....*Treasurer*

*New Members:* George P. Thomas, 30 Lake View Park; Michael L. Casey, 95 Sophia st,; George G. Carroll, jr., 304 West av.; Wm. B. Conner, 381 Andrew st.; Myron B. Palmer, 731 Main st., east; Perry Bly, 98 Park av.; John H. Acheson, 115 Atlantic av.; W. Douglas Ward, 12 Grove pl.; Joseph S. Campbell, 57 Clinton av., south, all of Rochester, and John L. Hazen, Brockport.

*Deceased:* J. D. Dunning, Webster, Oct. 27, 1901, æt. 76; E. M. Moore, Rochester, March 3, 1902, æt. 89; E. E. Whitcomb, Rochester, August, 1901, æt. 50; A. N. Braman.

Number of Members, 268.

## MEDICAL SOCIETY OF THE COUNTY OF MONTGOMERY.

(Organized July, 1806.)

MEETINGS.—Annual, second Wednesday in December, at Fonda; semi-annual, second Wednesday in June, at Canajoharie; quarterly, second Wednesday in September and March, at Amsterdam.

*Officers.* (December, 1901.)

C. W. DeBaun, Fonda.....*President*
James B. Conant, Amsterdam.....*Vice-President*
Otis Z. Bouton, Fultonville.....*Secretary*
Wm. J. Peddie, Fultonville.....*Treasurer*

Number of Members, 35.

## MEDICAL SOCIETY OF THE COUNTY OF NEW YORK

MEETINGS.—Annual, fourth Monday in October; stated meetings, the fourth Monday in each month, June, July, and August excepted, at the New York Academy of Medicine, 17 West Forty-third Street.

*Officers.* (1902.)

Frank Van Fleet, 63 E. 79th st.....*President*
Charles N. Dowd, 135 W. 73d st.....*1st Vice-President*
Robert Lewis, Jr., 48 W. 40th st.....*2d Vice-President*
John V. D. Young, 60 West 76th st.....*Secretary*
Edmund P. Fowler, 18 E. 58th st.....*Asst. Secretary*
John S. Waren, 150 W. 48th st.....*Treasurer*

*Censors:* George B. Fowler, 18 East 58th st.; Henry S. Stearns, 45 West 58th st.; Wendell C. Phillips, 350 Madison av.; Robert T. Morris, 58 West 56th st.; James F. McKernon, 62 West 52nd st.

*Counsel for the Society:* Hill, Stürcke & Andrews, 52 William st.

*Editor of Medical Directory:* Daniel Lewis, 252 Madison av.

Number of Members, 1639.

## NEW YORK ACADEMY OF MEDICINE

(Instituted January 6, 1847. Incorporated June 23, 1851.)

MEETINGS.—Stated, first and third Thursdays in every month, from the first Thursday in October to the first Thursday in June, inclusive, at 8 P. M., at 17 West Forty-third Street, New York; nomination of officers, first Thursday in December; election, third Thursday in December. Library open free to the public from 10 A. M. to 6 P. M., to members from 10 A. M. to 10 P. M.; in summer, 10 A. M. to 6 P. M. Physicians in active practice for the three years preceding application, and residents of the State of New York, are eligible for Resident Fellowship. Surgeons in the U. S. Army, Navy, or Marine Hospital Service, and physicians residing in other States, are eligible for Non-resident Fellowship.

*Officers.* (1902.)

Robert F. Weir.....*President*
George L. Peabody, Charles H. Dana, Vergil P. Gibney.....*Vice-Presidents*
John H. Huddleston, 126 W. 85th st., New York...*Corresponding Secretary*
L. Faugères Bishop.....*Corresponding Secretary*
Herman L. Collyer.....*Treasurer*
A. B. Judson.....*Statistical Secretary*
Oscar H. Holder.....*Assistant Secretary*

*Trustees:*

Abraham Jacobi, *Chairman*, Joseph D. Bryant, Arthur M. Jacobus,
Edward G. Janeway, A. Alexander Smith.
Reginald H. Sayre, *Treasurer for the Trustees.*

*Committee on Admissions:*

Henry Ling Taylor, *Chairman*, John Blake White, Charles E. Nammack,
J. V. D. Young, Walter L. Carr.

*Committee on Library:*

Edward D. Fisher, *Chairman*, Augustus Caillé, Alfred Meyer,
Charles L. Gibson, Walter B. James.
Mr. John S. Browne, *Resident Librarian.*

*Executive Committee:*

Abraham Jacobi, *Chairman*, R. F. Weir, A. M. Jacobus,
E. D. Fisher, J. H. Huddleston.
Howard Van Sinderen, *Counsel to the Academy.*

*Delegates to State Medical Society:*

John H. Huddleston, Egbert Le Fevre, L. F. Bishop,
J. A. Booth, James Ewing.

## MEDICAL SOCIETY OF THE COUNTY OF NIAGARA.

MEETINGS.—Annual, first Tuesday in June; semi-annual, first Tuesday in January; quarterly, first Tuesday in April and September.

*Officers.* (List not revised.)

W. A. Scott, Niagara Falls.....*President*
G. H. Minard, Lockport.....*Vice-President*
C. G. Leo Wolf, Niagara Falls.....*Secretary*
John Foote, Lockport.....*Treasurer*

*Censors:* M. S. Kittinger, J. H. Miller, F. J. Baker, H. A. Wilmot.

*Committee on Hygiene:* A. N. Moore, *Chairman;* F. J. Baker, H. C. Hill, M. S. Kittinger, Walter McChesney, M. H. Cole, T. B. Cosford.

*Deceased:* Peter Faling, Gasport, November 23, 1901, æt. 62.

Number of Members, 45.

## MEDICAL SOCIETY OF THE COUNTY OF ONEIDA.

MEETINGS.—Annual, second Tuesday in April; semi-annual, second Tuesday in October; quarterly, Second Tuesday in July and January. The semi-annual meeting is held in Rome; the others in Utica.

*Officers.*

A. J. Browne, Utica.....*President*
Charles Bernstein, Rome.....*Vice-President*
L. F. Pettengill, Utica.....*Secretary*
Herbert G. Jones, Utica.....*Treasurer*
Walter Gibson.....*Librarian*

*Censors:* William Stump, W. C. Gibson, H. L. Borland, F. H. Peck, B. P. Allen.

*New Members:* John F. Fitzgerald, Rome; F. W. Smith, Utica; J. A. Stranahan, Rome.

*Deceased:* F. E. Barrows, Clinton; William M. James, Whitesboro, August 6, 1901, æt. 62; J. M. Sweeney, Utica.

Number of Members, 125.

## MEDICAL SOCIETY OF THE COUNTY OF ONONDAGA.

(Organized in 1806.)

MEETINGS.—Annual, second Tuesday in May; semi-annual, third Tuesday in December; quarterly, at such intermediate times as the Society may direct. All meetings are held in Syracuse.

*Officers.* (May, 1902.)

R. A. Whitney, Liverpool.....*President*
E. J. Wynkoop, Syracuse.....*Vice-President*
A. S. Hotaling, Syracuse.....*Secretary*
F. H. Flaherty, Syracuse.....*Treasurer*

*Deceased:* D. W. Burdick, Syracuse, May 3, 1902, æt. 64; J. V. Kendall, Baldwinsville, August 5, 1901, æt. 84; H. P. Tolman, Onondaga Valley, November 10, 1901, æt. 78.

Number of Members, 134.

## MEDICAL SOCIETY OF THE COUNTY OF ONTARIO.

MEETINGS.—Annual, second Tuesday in July; quarterly, second Tuesday in October, January, and April.

*Officers.*

W. A. Howe, Phelps.....*President*
C. S. Thayer, Clifton Springs.....*Vice-President*
D. A. Eiseline, Shortsville.....*Secretary and Treasurer*

*Deceased:* E. R. Bishop, Geneva; C. O. Jackson, Victor, January 27, 1902, æt. 47.

Number of Members, 51.

## MEDICAL SOCIETY OF THE COUNTY OF ORANGE.

(Organized July 1, 1806.)

MEETINGS.—Annual, first Tuesday in May; semi-annual, first Tuesday in October.

*Officers.* (May, 1902.)

D. B. Hardenbergh, Middletown.....*President*
C. E. Townsend, Newburgh.....*Vice-President*
M. A. Stivers, Middletown.....*Secretary*
W. I. Purdy, Middletown.....*Treasurer*

*Censors:* C. N. Knapp, W. I. Purdy, I. B. Peters, C. W. Dennis, E. A. Nugent.

*Committee on Hygiene:* J. I. Brownell, W. W. Wendover, M. H. Dubois, J. T. Howell.

*Deceased:* Solomon G. Carpenter, Chester, September 13, 1901, æt. 76; J. Moffatt, Washingtonville, August 16, 1901, æt. 68.

Number of Members, 75.

## MEDICAL SOCIETY OF THE COUNTY OF ORLEANS.

(Organized January 8, 1873.)

MEETINGS.—Annual, second Wednesday in May; second meeting, second Wednesday in September; third meeting, second Wednesday in January.

*Officers.* (List not revised.)

J. J. Simonds, Barre Centre.....*President*
Mrs. E. W. Squier, Albion.....*Vice-President*
John Dugan, Albion.....*Secretary and Treasurer*

*Censors:* J. H. Taylor, S. R. Cochrane, McLean Caverly, H. L. James, R. W. Bamber.

*Deceased:* Samuel R. Q. Cochrane, Albion, May 24, 1902, æt. 63.

Number of Members, 29.

## MEDICAL SOCIETY OF THE COUNTY OF OSWEGO.

(Organized in 1821.)

MEETINGS.—Annual, second Tuesday in May; semi-annual, second Tuesday in November, at Oswego.

*Officers.* (List not revised.)

Emory J. Drury, Phœnix.....*President*
H. P. Marsh, Fulton.....*Vice-President*
Wm. C. Todt, Oswego.....*Secretary*
P. M. Dowd, Oswego.....*Treasurer*

*Censors:* S. A. Russell, J. L. More, Roscoe J. Taylor, J. W. Eddy, John W. Huntington.

*Deceased:* R. N. Cooley, Hanibal Centre, July 15, 1901, æt. 69.

Number of Members, 59.

## MEDICAL SOCIETY OF THE COUNTY OF OTSEGO.

(Organized in 1806.)

MEETINGS.—Annual, fourth Tuesday in May, at Cooperstown; semi-annual, second Tuesday in December.

*Officers.* (May, 1902.)

Andrew J. Butler, Unadilla.....*President*
B. W. Dewar, Cooperstown.....*Vice-President*
H. W. Boorn, Schenevus.....*Secretary*
James Burton, Cooperstown.....*Treasurer*

*Censors:* C. E. Parish, J. H. Moon, J. W. Swanson.

*New Member:* Henry L. Cruttenden, Cooperstown.

*Deceased:* J. K. Leaning, Cooperstown, April 4, 1902, æt. 79.

Number of Members, 50.

## MEDICAL SOCIETY OF THE COUNTY OF PUTNAM.

(Organized July 29, 1879.)

MEETINGS.—Annual, fourth Tuesday in April; semi-annual, fourth Tuesday in October.

[Society at present not in active existence.]

## MEDICAL SOCIETY OF QUEENS-NASSAU.

MEETINGS.—Annual, last Tuesday in May; semi-annual, last Tuesday in October.

*Officers.* (May, 1902.)

Louis N. Lanehart, Hempstead.....*President*
John F. Valentine, Richmond Hill.....*Vice-President*
James S. Cooley, Glen Cove.....*Secretary and Treasurer*
John Ordronaux.....*Historian*

*Censors:* G. Herbert Carter, William J. Malcolm, Frank T. DeLano, P. Bumster, Willet S. Brown.

*New Members:* Samuel G. Bradbury, Lynbrook; Burton W. Brush, Woodside; Martin F. Burns, Long Island City; J. P. Moore, Astoria; W. H. Namack, Far Rockaway; James L. New, Long Island City; H. G. Wahlig, Sea Cliff.

Number of Members, 82.

## MEDICAL SOCIETY OF THE COUNTY OF RENSSELAER.

(Organized in 1806.)

MEETINGS.—Annual, second Tuesday in May; stated, second Tuesday in each month, except July and August.

*Officers.* (List not revised.)

G. A. Bradbury, Troy.....*President*
Aaron D. Davidow, Troy.....*Vice-President*
H. E. De Freest, Troy.....*Secretary*
R. B. Bontecou, Troy.....*Treasurer*

*Censors:* J. C. Hutchinson, R. A. Kirkpatrick, James Love, all of Troy.

Number of Members, 65.

## MEDICAL SOCIETY OF THE COUNTY OF RICHMOND.

MEETINGS.—Annual, second Wednesday in January; stated, second Wednesday in each month, at 8.15 P. M., at the Staten Island Academy, New Brighton.

*Officers.* (1902.)

C. Wilmot Townsend, New Brighton.....*President*
William Bryan, W. New Brighton.....*Vice-President*
Horace W. Patterson, New Brighton.....*Secretary and Treasurer*

*Censors:* Jefferson Scales, New Brighton; H. C. Johnson, New Brighton; G. P. Jessup, New Dorp.

## MEDICAL SOCIETY OF THE COUNTY OF ROCKLAND.

(Reorganized May 18, 1850, and May, 1901.)

MEETINGS.—Annual, last Tuesday in May; semi-annual, last Tuesday in October.

*Officers.*

E. B. Laird, Haverstraw.....*President*
S. Demarest, Suffern.....*Vice-President*
John Sengstacken, Stony Point.....*Secretary*
John M. Hasbrouck, Garnerville.....*Treasurer*

*Members Elected:* J. O. Polhemus, M. B. Van Houghton, E. H. Maynard, A. O. Bogart, G. F. Blauvelt, R. D. Bogart, E. B. Laird, T. C. Wood, S. Demarest, J. Hasbrouck, J. Sengstacken, L. L. Gillett, John Gillett, B. V. Dolph, F. E. Paget, W. S. Taylor.

Number of Members, 16.

## MEDICAL SOCIETY OF THE COUNTY OF ST. LAWRENCE.

(Reorganized 1861.)

MEETINGS.—Annual, first Tuesday in April; quarterly, first Tuesday in January, April, July, and October.

*Officers.* (1902.)

F. F. Taylor, Massena.....*President*
James Wiltsie, Bensen Mines.....*Vice-President*
S. W. Close, Gouverneur.....*Secretary*
A. H. Allen, Gouverneur.....*Treasurer*

Number of Members, 53.

## MEDICAL SOCIETY OF THE COUNTY OF SARATOGA.

(Organized in July, 1807.)

MEETINGS.—Annual, first Tuesday in June; semi-annual, first Tuesday in December.

## MEDICAL SOCIETY OF THE COUNTY OF SCHENECTADY.

(Organized January 16, 1869.)

MEETINGS.—Annual, second Tuesday in January; semi-annual, second Tuesday in June; monthly, second Tuesday in February, March, April, May, September, November, and December.

*Officers.* (Not revised.)

C. F. Clowe, Schenectady.....*President*
J. F. McEncroe, Schenectady.....*Vice-President*
Edward J. Wiencke, Schenectady.....*Secretary*
Joseph Raymond, Schenectady.....*Treasurer*

*Censors:* John A. Heatley, Charles C. Duryea, Lester Betts.

*Deceased:* N. C. Cheesman, Scotia, September 12, 1901, æt. 67.

Number of Members, 54.

## MEDICAL SOCIETY OF THE COUNTY OF SCHOHARIE.

(Organized in 1806; reorganized in 1857.)

MEETINGS.—Annual, first Tuesday in June; semi-annual, second Tuesday in October.

*Officers.* (1902)

O. A. Snyder, Schoharie.....*President*
Nathan Smith, Richmondville.....*Vice-President*
H. F. Kingsley, Schoharie.....*Secretary*
Le Roy Becker, Cobleskill.....*Treasurer*

*Censors:* H. L. Odell, Sharon Springs; F. L. Posson, Schoharie; C. K. Frazier, Cobleskill; C. S. Best, Middleburgh; L. O. White, Sharon Springs.

*New Members:* M. D. Lipes, Howe's Cave; Carolyn Allendorf, Cobleskill; L. O. White, Sharon Springs; Meletus Bruce, Charlotteville.

Number of Members, 44.

## MEDICAL SOCIETY OF THE COUNTY OF SCHUYLER.

(Organized December, 29, 1857.)

MEETINGS.—Annual, second Tuesday in January; semi-annual, second Tuesday in July.

*Officers.* (List not revised.)

W. H. Heist, Townsend.....*President*
J. Franklin Barnes, Watkins.....*Vice-President*
George M. Post, Montour Falls.....*Secretary and Treasurer*

*Censors:* S. B. Allen, Burdett; E. H. Davis, W. H. Heist, G. M. Post, George P. Laylor.

Number of Members, 15.

## MEDICAL SOCIETY OF THE COUNTY OF SENECA.

MEETINGS.—Annual, second Thursday in May.

*Officers.* (List not revised.)

John F. Crosby, Seneca Falls.....*President*
D. F. Everts, Romulus.....*Secretary*
Frank M. Severson, Seneca Falls.....*Treasurer*

*Deceased:* Charles B. Osborn, Waterloo, October 2, 1901, æt. 51.

Number of Members, 35.

## MEDICAL SOCIETY OF THE COUNTY OF STEUBEN.

MEETINGS.—Annual, second Tuesday in May; semi-annual, second Tuesday in October; quarterly, second Tuesday in August.

*Officers.* (1902.)

Harvey P. Jack, Canisteo..... *President*
C. B. Stevens, Wallace.....*Vice-President*
W. W. Smith, Avoca.....*Secretary and Treasurer*

*Censors:* E. J. Carpenter, Corning; C. S. Parkhill, Hornellsville; H. R. Ainsworth, Addison; J. P. Smith, Bath; Willis S. Cobb, Corning.

*New Members:* George C. McNett, Bath; H. H. Hubbel, Corning; James C. Dorr, Wayland; George M. Skinner, Wayland.

*Deceased:* M. T. Babcock, Hammondsport, March, 1902, æt. 77; Charles W. Hoyt, Corning, July 23, 1901, æt. 33; C. B. Robertson, Tolesville.

Number of Members, 69.

## MEDICAL SOCIETY OF THE COUNTY OF SUFFOLK.

(Organized July 22, 1806.)

MEETINGS.—Annual, in April, at Riverhead, during court week; semi-annual, in October, on the day and at the place directed at the April meeting.

*Officers.* (April, 1902.)

John H. Benjamin, Riverhead.....*President*
A. C. Loper, Greenport.....*Vice-President*
P. V. B. Fowler, Centre Moriches.....*Secretary*
B. D. Skinner, Greenport.....*Treasurer*
J. H. Benjamin, Riverhead.....*Librarian*

*Censors:* A. H. Terry, Patchogue; Addison Raynor, Riverhead; Charles E. Wells, Sag Harbor.

Number of Members, 64.

## MEDICAL SOCIETY OF THE COUNTY OF SULLIVAN.

(Organized October 3, 1809.)

MEETINGS.—Annual, first Wednesday after the second Tuesday in June; semi-annual, whenever the Society directs at the annual meeting.

*Officers.*

Charles E. Piper, Wurtsboro.....*President*
W. W. Murphy.....*Vice-President*
Charles S. Payne, Liberty.....*Secretary*
W. G. Steele, Mongaup Valley.....*Treasurer*

*Censors:* F. A. McWilliams, C. E. Piper, G. F. Rice.
[Information supplied by Dr. G. F. Rice, of Jeffersonville; Society inactive.]

Number of Members, 20.

## MEDICAL SOCIETY OF THE COUNTY OF TIOGA.

MEETINGS.—Annual, second Tuesday in January; first quarterly, second Tuesday in April; semi-annual, second Tuesday in July; second quarterly, second Tuesday in October.

*Officers.* (January, 1902.)

William A. Moulton, Nichols.....*President*
George M. Cady, Owego.....*Vice-President*
E. E. Bauer, Owego.....*Secretary*
J. M. Barrett, Owego.....*Treasurer*

*Censors:* George M. Cady ,Owego; M. B. Deane, Candor; S. W. Thompson, Owego; James Allen, Richford; W. A. Moulton, Nichols.

*Deceased:* C. E. Hallenbeck, Halsey Valley, September 7, 1901, æt.51.

Number of Members, 37.

## MEDICAL SOCIETY OF THE COUNTY OF TOMPKINS.

(Organized about 1815; reorganized October, 1862.)

MEETINGS.—Annual, last Wednesday in May; semi-annual, last Wednesday in November.

*Officers.* (List not revised.)

Paul R. Brown, Ithaca.....*President*
Edward Meany, Ithaca.....*Vice-President*
Alice M. Potter, Ithaca.....*Secretary*
Hardy T. Rhodes, Ithaca.....*Treasurer*

*Censors:* S. H. Peck, Ithaca; W. C. Gallagher, Eugene Baker, Edward Meany.

*Committee on Hygiene:* B. G. Wilder and James Law, Ithaca.

Number of Members, 22.

## MEDICAL SOCIETY OF THE COUNTY OF ULSTER.

MEETINGS.—Annual, last Tuesday in May, at Kingston; quarterly, second Tuesday in September, December, and March, at such places as Comitia Minora may direct.

*Officers.* (1902.)

Rufus Crawford, West Camp.....*President*
Daniel Connelly, Kingston.....*Vice-President*
A. S. Vrooman, Kingston.....*Secretary*
E. H. Loughran, Kingston.....*Treasurer*

*Censors:* A. H. Mambert, Rondout; E. H. Loughran, Kingston; J. L. Preston, Kingston; W. D. Hasbrouck, Rondout; C. V. Hasbrouck, Rosendale.

*Committee on Hygiene:* J. Chambers, Kingston; R. Crawford, West Camp; C. W. Crispell, Rondout; B. B. Bloom, Shokan; C. A. Munn, Kingston.

*New Members:* George F. Chandler, Kingston; J. L. Preston, Kingston; F. A. Hunt, Napanock; J. Van DeMark, Rosendale; H. C. Keator, Rosendale; G. W. Ross, Port Ewen.

*Deceased:* R. M. Murphy, Rondout, August 22, 1901, æt. 52; S. Schoonmaker, September 18, 1901, æt. 64.

Number of Members, 56.

## MEDICAL SOCIETY OF THE COUNTY OF WARREN.

MEETINGS.—Annual, second Tuesday in June, at Glens Falls; semi-annual, when and where the Society determines.

*Officers.* (List not revised.)

F. G. Fielding, Glens Falls.....*President*
G. A. Chapman, Glens Falls.....*Vice-President*
W. J. Hunt, Glens Falls.....*Secretary*
T. J. Henning, Glens Falls.....*Treasurer*

*Censors:* D. B. Howard, Warrensburgh; D. J. Fitzgerald, Glens Falls; E. S. Bullis, Glens Falls; D. M. Hall, Glens Falls; F. A. Aldrich, Chestertown.

*Deceased:* G. H. McMurray, Glens Falls, July 12, 1901, æt. 35.

Number of Members, 20.

## MEDICAL SOCIETY OF THE COUNTY OF WASHINGTON.

(Organized July 1, 1806.)

MEETINGS.—Annual, third Tuesday in May, at Argyle; semi-annual, first Tuesday in October, at Sandy Hill.

*Officers.* (May, 1902.)

D. M. McKenzie, Greenville.....*President*
Samuel Parkley, Hartford.....*Vice-President*
Henry Root, Whitehall.....*Secretary and Treasurer*

*Censors:* S. J. Banker, Fort Edward; R. C. Davies, Middle Granville; Lewis R. Oatman, Greenwich.

*Committee on Hygiene:* W. C. Cuthbert, Sandy Hill; J. W. Dean, South Hartford; W. M. Rapp, Argyle.

*Deceased:* I. T. Monroe, Granville, December 29, 1901; T. C. Wallace, Cambridge.

Number of Members, 43.

## MEDICAL SOCIETY OF THE COUNTY OF WAYNE.

(Organized July 2, 1823.)

MEETINGS.—Annual, second Tuesday in July, at Lyons; semi-annual, second Tuesday in January, at Newark.

*Officers.* (List not revised.)

Robert S. Carr, Williamson.....*President*
G. D. Winchell, Rose.....*Vice-President*
J. N. Arnold, Clyde.....*Secretary*
Darwin Colvin, Clyde.....*Treasurer*

*Censors:* J. N. Arnold, Clyde; M. A. Veeder, Lyons; H. L. Chase, Palmyra; W. J. Coppernall, Newark; E. H. Lapp, Williamson.

*Deceased:* Timothy S. Fish, Wolcott, August 9, 1901, æt. 55.

Number of Members, 34.

## MEDICAL SOCIETY OF THE COUNTY OF WESTCHESTER

(Organized May 8, 1797.)

MEETINGS.—Annual, third Tuesday in May, at White Plains; stated, third Tuesday in September, November, January, and March. (Time and place of stated meetings at the option of the Society.)

*Officers.*

Robert T. Howe, Mt. Vernon.....*President*
W. A. Miner, Ossining.....*Vice-President*
D. M. Orleman, Peekskill.....*Secretary*
C. F. Chapman, Mt. Kisco.....*Treasurer*
Newton F. Curtis, White Plains.....*Curator*

*Censors:* Arch M. Campbell, *Chairman*, Mt. Vernon; R. C. Eddy, W. H. Sherman.

*Committee on Hygiene:* A. O. Snowden, *Chairman*, Peekskill; Henry Moffat, V. Browne.

*Deceased:* George H. Magness, White Plains, June 25, 1901, æt. 50.

Number of Members, 170.

## MEDICAL SOCIETY OF THE COUNTY OF WYOMING.

MEETING.—Annual, second Tuesday in June.

List of Officers and Members not revised.

## MEDICAL SOCIETY OF THE COUNTY OF YATES.

MEETINGS.—Annual, first Tuesday in June; semi-annual, second Tuesday in January. Other meetings as directly by the Society.

*Officers.* (List not revised.)

Charles M. Van Dyke, Himrod.....*President*
_____, _____, _____.....*Vice-President*
Albert Ellison, Benton Centre.....*Secretary*
Byron B. Havens, Penn Yan.....*Treasurer*

*Censors:* N. L. Lusk, J. M. Waddell, William A. Oliver.

Number of members, 19. Whole number, 5,600.

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# INCORPORATED VOLUNTARY MEDICAL SOCIETIES

(By-Laws, Chapter 1, Section 2)

## MEDICAL ASSOCIATION OF NORTHERN NEW YORK.

(Organized, 1872; incorporated, 1889.)

Annual meeting, second Tuesday in October, at Malone.

*Officers.*

Frank Madden, Plattsburgh.....*President*
W. S. Daly, Ogdensburgh.....*Vice-President*
R. J. Wilding, Malone.....*Secretary*
G. H. Oliver, Malone.....*Treasurer*

*Trustees:* J. Reynolds, C. Skinner, J. H. Smith, D. S. Kellogg, T. A. Pease, G. H. Oliver.

*Delegate to State Medical Society:* Cassius D. Silver, Plattsburgh.

Number of Members, 112.

## ROCHESTER PATHOLOGICAL SOCIETY.

(Delegate admitted 1891.)

*Officers.*

Charles Dean Young, 5 Gibbs st.....*President*
S. W. Little, 162 Plymouth av.....*Vice-President*
William D. Becker, 8 Franklin sq.....*Secretary and Treasurer*

*Delegates to State Medical Society:* Frederick D. Andrew, 28 S. Union st.

Number of Members, 119.

## ELMIRA ACADEMY OF MEDICINE.

(Delegate admitted 1891.)

*Officers.*

R. R. Chilson, Elmira.....*President*
John C. Fisher.....*Vice-President*
Arthur W. Booth, Elmira.....*Secretary*
Hamilton D. Wey.....*Treasurer*

*Delegate to State Medical Society:* C. G. R. Jennings, Elmira.

Number of Members, 48.

## UTICA MEDICAL LIBRARY ASSOCIATION.

(Delegate admitted 1891.)

*Officers.*

F. D. Crim, Utica.....*President*
W. Moffatt, Utica.....*Vice-President*
W. S. Morris, Deerfield.....*Secretary*
F. J. Douglass.....*Treasurer*
Angeline Martine.....*Librarian*

*Trustees:* C. W. Crumb, F. M. Miller, H. C. Palmer, B. P. Allen, T. Z. Jones, W. H. Brownell, E. D. Fuller.

*Librarian:* Angeline Martine.

Number of Members 69.

## UTICA MEDICAL CLUB.

(Delegate admitted 1892.)

*Officers.*

A. M. Johnson.....*President*
C. G. Ward.....*Vice-President*
M. J. Davies, 191 Genesee st., Utica.....*Secretary and Treasurer*

*Delegate to State Medical Society:* W. R. Marsden.

Number of Members, 17.

## SOCIETY OF PHYSICIANS OF CANANDAIGUA.

(Delegate admitted 1892.)

*Officers.*

A. L. Beahan, Canandaigua.....*President*
O. J. Hallenbeck.....*Vice-President*
H. C. Buell, Canandaigua.....*Secretary and Treasurer*

*Directors:* A. L. Beahan, J. H. Jewett, H. C. Buell, O. J. Hallenbeck.

*Delegate to State Medical Society:* John H. Jewett.

Number of Members, 7.

PRACTITIONERS' SOCIETY OF ROCHESTER.

(Delegate admitted 1893.)

*Officers.*

Helen DeWitt Justin.....*President*
Kathleen Buck.....*Vice-President*
M. Mary Allen, 297 Alexander st.....*Secretary and Treasurer*

Number of Members, 23.

SYRACUSE ACADEMY OF MEDICINE.

(Delegate admitted 1894.)

*Officers.*

J. L. Heffron, 523 S. Salina st.....*President*
B. W. Loomis, 1033 S. Salina st.....*Vice-President*
George B. Broad, 505 S. Warren st., Syracuse.....*Secretary*
A. E. Larkin, 324 Montgomery st.....*Treasurer*

*Delegate to State Medical Society:* F. H. Flaherty.

Number of Members, 180.

LONG ISLAND MEDICAL SOCIETY.

(Delegate admitted 1895.)

*Officers.*

Wm. S. Hubbard, Brooklyn.....*President*
Ralph H. Pomeroy, Brooklyn.....*Vice-President*
Edward Hodge, 156 Halsey st., Brooklyn.....*Secretary*
A. C. Jacobson.....*Treasurer*

*Trustees* Arthur C. Brush, Alex. C. Howe, P. Chalmers Jameson, W. S. Hubbard, Wm. F. Campbell, John O. Polak, Edward E. Cornwall.

*Delegate to State Medical Society:* L. L. Nichols, Brooklyn.

Number of Members, 43.

AMSTERDAM MEDICAL SOCIETY.

(Delegate admitted 1895.)

*Officers.*

C. F. Zimmerman.....*President*
A. V. H. Smythe.....*Vice-President*
J. B. Conant.....*Secretary and Treasurer*

*Executive Committee:* Edmund F. Bronk, Archibald Gilbert, H. French.

*Pathologist:* E. J. Collier.

*Delegate to State Medical Society:* James R. Fairbanks.

Number of Members, 24.

MEDICAL ASSOCIATION OF THE CITY OF MT. VERNON AND ENVIRONS.

(Delegate admitted 1895.)

*Officers.*

George C. Weiss.....*President*
William H. Purdy.....*Vice-President*
John A. Romaine, Mt. Vernon.....*Secretary*
Archibald Banning.....*Treasurer*
Thomas S. Sharkey.....*Curator*

*Censors:* Arch. T. Banning, George C. Weiss, Charles W. Oakes.

Number of Members, 33.

THE WEST END MEDICAL SOCIETY OF NEW YORK CITY.

(Incorporated 1895; Delegate admitted 1901)

*Delegate to State Medical Society:* Charles G. Kerley, 113 W. 83d st.

Number of Members, 60.

THE GERMAN MEDICAL SOCIETY OF BROOKLYN.

(Delegate admitted 1901.)

*Delegate to State Medical Society:* Joseph Meyer, 228 Vernon av., Brooklyn.

THE GLOVERSVILLE AND JOHNSTOWN MEDICAL SOCIETY.

(Delegate admitted 1901.)

*Delegate to State Medical Society:* Arthur C. Hagedorn, Gloversville.

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